

















# **SMOKELESS AIR**

**JOURNAL OF THE  
NATIONAL SOCIETY FOR CLEAN AIR**



**No. 149**



**SPRING 1969**



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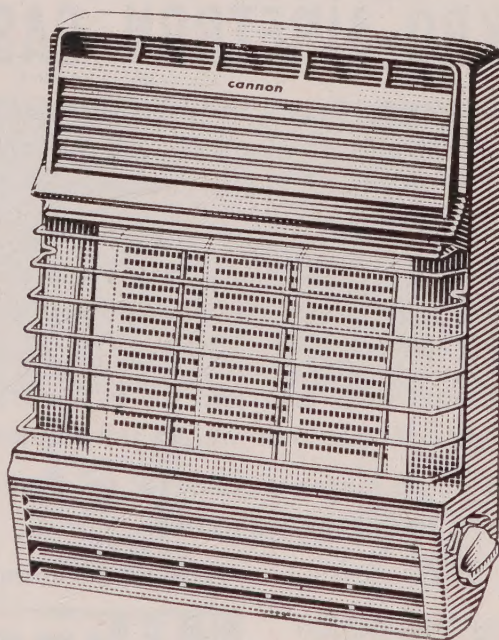
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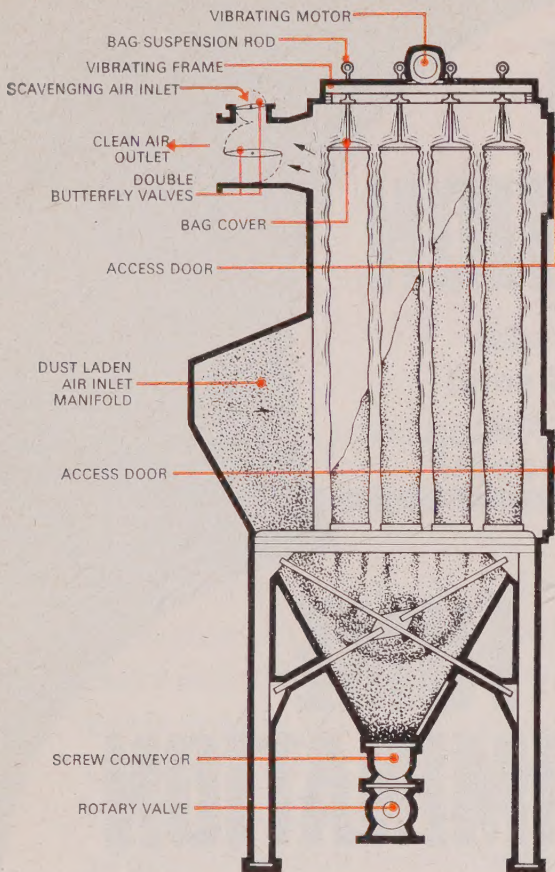
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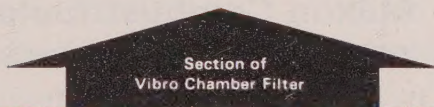


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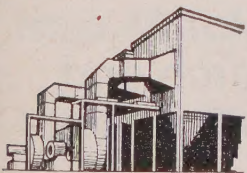


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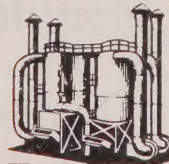
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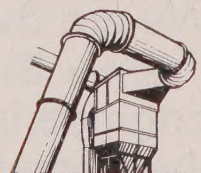


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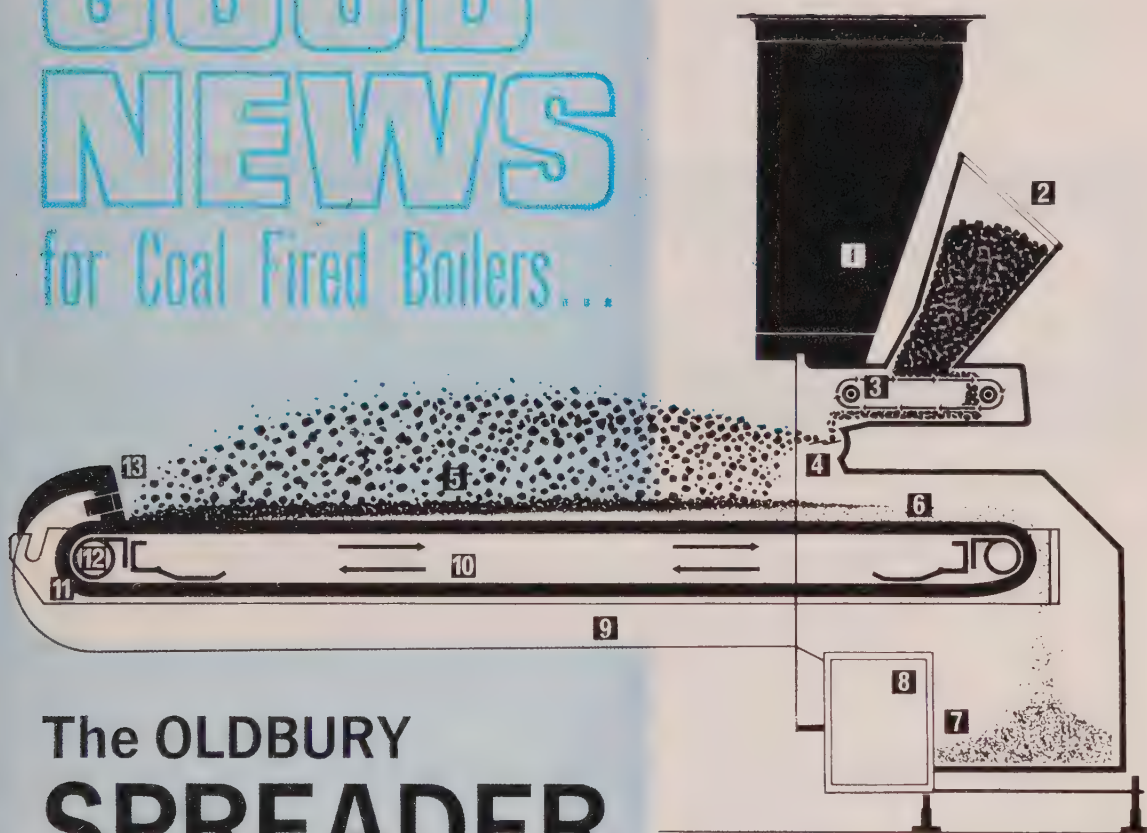


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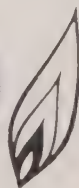
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# SMOKELESS AIR

Vol. XXXIX No. 149

Spring 1969

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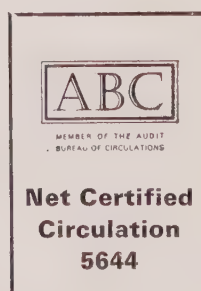
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*Ship, towers, domes, theatres and temples lie  
Open unto the fields, and to the sky:  
All bright and glittering in the smokeless air*

# SMOKELESS AIR

## Clean Air Awards

On page 202 of this issue will be found an announcement and the rules regarding Clean Air Awards.

For some time, the Society has been considering the question and the Publicity Committee have been busily engaged in this for the past 12 months. After deciding in principle that it would be a good thing to introduce this scheme and deciding the basis on which it could be done, a working party was appointed to work out the details. The working party has now reported and the Executive Council have accepted their recommendations. As a Society, we are greatly indebted to the members of the working party for what they have already done and for their willingness to continue as judges when the scheme comes into operation in 1970.

It has been felt all along that some of the judges must be from outside the Society. Accordingly, it has been decided that the panel of judges shall comprise the Chairman of the Society's Publicity Committee, a Medical Practitioner nominated by the Medical Research Council, a Member of the Alkali Inspectorate nominated by the Ministry of Housing and Local Government, and a Scientist from the Warren Spring Laboratory nominated by its Director. Dr. D. Gall of Warren Spring Laboratory and Dr. W. E. Grant an Alkali Inspector have already done much work in the working party and will continue in the capacity of judges. Professor P. J. Lawther will represent the Medical Research Council.

If the scheme is to succeed, it is essential that it receives the maximum amount of publicity. This is the first announcement that has been made, but simultaneously with the publication of this number of *Smokeless Air*, announcements will be made through the Press and also by letter to all industries and firms that advertise and exhibit with the Society, the various Municipal Associations, Trade Associations, Learned Societies and Institutions, all Local Clean Air Councils, the various Ministries concerned with Clean Air and, of course, all Divisions of the Society, the Scottish Development Board and the Warren Spring Laboratory.



Obviously there have to be rules, but these have been framed to make it as easy as possible for anybody to nominate any person, Local Authority, or industry or firm for an award. The judges themselves appreciate that individuals in particular may be reluctant to put forward their own names. The judges therefore look to the individual members of the Society, to the divisions of the Society, to Clean Air Councils and Local Authorities and those who know, to put forward the names of people who they think merit an award. We hope that industry will not be slow in putting forward their own names if they think that they warrant an award. Similarly, we have confidence that Local Authorities will not be shy about telling the Society, through the judges, of their achievements.

The first entries have to be in by 31 March, 1970 and these entries will cover a period of 15 years from 1 January, 1955 to 31 December, 1969. It is realized that much has been done in this period which includes the passing of the first Clean Air Act and this is why it has been chosen.

The judges are under no misapprehension that they are going to have to do a lot of sorting out and get through a tremendous amount of work. They will be helped in their work if entries come forward in good time and state quite clearly and categorically the particular form of the achievement for which an award is claimed.

We look to all members of the Society be they individuals, Local Authorities, or industries to publicize this scheme as much as they can.

## Smoke Control

As a result of our plea for more information about progress in Smoke Control, we have now heard about what a number of authorities are doing.

Horbury U.D.C., a small authority on the fringe of a "black area", after initial difficulties over concessionary coal for miners, has made steady progress. In 1964, which saw the start of the scheme, the average daily measurement of smoke was 232 microgrammes per cubic metre; three years later the figure was down to 106, which augurs well for 1971 when the scheme should be completed.

In the centre of Leeds, too, results are encouraging. In 1953 the average smoke level was 664 microgrammes per cubic metre. In 1967 the level was 147.4. By July 1968, about one quarter of all the houses in Leeds were subject to smoke control orders. The intention is to include all dwelling houses by 1975, and it is hoped that in ten years the air of the city will be clean.

So far as domestic smoke was concerned, 1967 in the new County Borough of Warley, in the West Midlands, was a year of complete inaction because of financial stringencies. By contrast, so far as industrial pollution was concerned, it was a profitable and busy year. Co-operation with the management of factories has been good and firms have undertaken the installation of arresters and the building of suitable high chimneys to reduce pollution.

It is unfortunate, but true, that Warley is not the only place where smoke control has been halted by financial considerations. It is to be hoped that circumstances will soon permit of programmes which have been halted being restarted. In this connection, Professor Andrew B. Semple of Liverpool recently broadcast a warning to Liverpool City Council not to postpone further implementation of the smoke control programme because of the contribution it made to the City's health.



# European Conservation Year 1970— Has the Society a Role?

Conservation has been practised by the diligent husbandman since time immemorial. Of recent years, as pressure of population makes larger and more destructive demands on our habitat, the word has taken on a greater significance. It is no longer sufficient for only the naturally provident and prudent members of society to practise conservation! Our shrinking resources cry out for succour from the entire community. Learned societies and public bodies have an important role to play in conservation by learning to co-ordinate their efforts to preserve our habitat.

1970 has been designated European Conservation Year. Intended to become the world's largest co-operative exercise to get people to care for their environment, the year will open with a Conference at Strasbourg from 9-13 February. With the title "Man and Environment", the Conference will consider how to maintain and improve Europe's natural resources—landscape, air, soil, water and wildlife—for man's greater benefit and enjoyment.

It has been suggested that supplementary conferences should be held on a national level to implement the aims of ECY. Conservation principles and policies must become part of the thinking and efforts of everyone whose work affects the environment. Specific aims for national symposia and conferences suggested are:

To acquaint all the appropriate national interests with the basic aim of conservation.

To secure the agreement of all organizations for the need to achieve this aim.

To obtain from each organization a clear expression of its special interest in, or demands on, the countryside.

Air, soil and water conservation, environmental contamination, especially relating to sources of power, pollution of air, water and soil, noise, etc., are listed among suggested themes for such conferences and it would seem that the National Society for Clean Air has an important contribution to make to ensure the success of the Year in Britain.

## Smoke Control Information for the Clean Air Year Book 1969/70

Although the Society endeavours each year to obtain as accurate figures as possible from the records of the Ministry of Housing and Local Government, regarding the smoke control progress of all local authorities in the United Kingdom, some up-to-date information is only obtainable from the local authorities themselves. It would be very much appreciated therefore, if as many local authorities as possible, would send without delay the following statistics to the Society:

1. Target date for completion of your Authority's smoke control programme.
2. Final acreage (when completed).
3. Acreage *in operation* on 1st April, 1969.
4. Number of premises *in operation* on 1st April, 1969.



# The Cost of Pollution

The Sheffield and District Clean Air Committee have drawn our attention to the fact that a Court imposed a fine of only £1 on a firm found guilty of pollution of the atmosphere by smoke. The Committee prosecuted the firm for emitting black smoke for 30 minutes contrary to the provisions of the Clean Air Act. The Magistrates heard the case and imposed the fine of only £1, the firm having pleaded guilty. The maximum penalty for such an offence is, of course, £100. The Sheffield and District Clean Air Committee rather naturally feel that the Magistrates cannot have appreciated the importance of their duties to enforce the law. As Councillor Blake, the Chairman of the Clean Air Committee said, the fine was almost a derisory one.

On the other hand we have recently heard that Mr. T. A. Simpson of Eccleshall, near Stoke on Trent has been prosecuted a second time for operating a registrable process (metal recovery), i.e. cable burning, without registration under the Alkali Act. On 20 September last Mr. Simpson pleaded guilty and was fined £60 with 22 guineas costs.

## Clean Air Responsible for City Blooms

Some 250,000 plants a year, in several hundred varieties, now bloom in the square mile of the City of London where ten years ago only privet, holly, laurel and plane trees grew. Pomegranates now grow in Bunhill Fields and what were formerly Victorian-type shrubberies now bloom with azaleas, camellias, rhododendrons and heather.

Mr. Peter Stagg, the Corporation gardens superintendent, says that this change has largely been made possible by cleaner air. But, he adds, how long the advantage of clean air remains depends largely on traffic. The menace to plant life of exhaust fumes has replaced the former one of soot and smog. "It would be ideal to see the motor car banned from the City."

## Smokeless Witchcraft

The Lancaster University Witchcraft and Occult Group has banned the use of coal, wood and all fuels which emit noxious fumes at its meetings. It has been suggested that the Group uses smokeless fuel so that it can be certain nobody will see its meeting place. The Chairman of the Group, a 20-year-old student, however, contends in a letter to the local press that the Group uses smokeless fuel in the interests of health, both spiritual and physical, and to promote the cause of clean air. And he encourages "all other religious organizations in the area" to do likewise.



# Further Comment on the Clean Air Act 1968

by J. E. Richards, M.A.P.H.I., A.M.Inst.F.,  
*Senior Smoke Prevention Officer, Manchester Corporation*

The Clean Air Act, 1968 (reviewed in *Smokeless Air*—Winter 1968) extends and revises certain provisions and procedures of the Clean Air Act, 1956 (the principal Act).

Sections 2, 6 and 8 to 15, together with Schedule 1 (with the exception of paragraphs 2, 5, 8, 9 and 11) and Schedule 2 of the new Act will come into operation on 1 April, 1969, under the first Commencement Order (Statutory Instrument, 1968, No. 1922 (C.27)), made on 2 December, 1968.

A Joint Circular, No. 69/68 from the Ministry of Housing and Local Government and No. 62/68 from the Welsh Office, issued on 30 December, 1968, draws the attention of local authorities to the Commencement Order and gives guidance and advice on the application of those sections which are brought into operation in an Explanatory Memorandum which forms an Appendix to the Circular.

The remaining provisions of the new Act, namely sections 1, 3, 4, 5 and 7 and the rest of Schedule 1, will be brought into operation by a further Commencement Order or Orders in due course.

The Explanatory Memorandum accounts for six closely printed pages of material which by its nature requires to be considered in full. Accordingly those responsible for implementing the new provisions will need to read the Act and the Memorandum carefully for themselves.

## Industrial Provisions

### Grit and Dust from Furnaces

Section 2 applies to a wider range of furnaces than did Section 5 of the principal Act, namely to any furnace burning solid, liquid or gaseous matter, excepting only domestic furnaces with a heating capacity of less than 55,000 British thermal units per hour. One object of including oil-fired and gas-fired furnaces is to include those processes where the material being heated forms the major part of the emission, such as the drying of sand and other powdery materials.

Regulations will be made in due course prescribing limits on emissions of grit and dust from chimneys of furnaces to which section 2 applies. In making them the Minister will have regard to the standards recommended in the Departmental publication "Grit and Dust", sent to local authorities under cover of Circular 52/67 (Ministry of Housing and Local Government) and 23/67 (Welsh Office).

The effect of the Regulations will be to make it an offence to exceed the prescribed limits and it will be a defence to prove that the best practicable means had been used for minimizing the alleged emission. During the period before



regulations come into force the use of “any practicable means there may be” is required to minimize the emission of grit and dust from the chimneys of furnaces covered by the section.

It will be a most difficult exercise to apply the standards even when the Regulations have been made. The case is well stated in Paragraph 2 of “Grit and Dust” which says “The magnitude of the task of measuring emissions and applying the results to control air pollution should not be underestimated. To measure grit and dust emission in a systematic and purposeful way is time consuming and costly and should not be required to be undertaken lightly. It is not envisaged that all boiler and furnace emissions should be tested, but only those thought to be causing or contributing to excessive pollution in the neighbourhood. The standards which are proposed can be met if the plant is reasonably modern, efficiently operated and well maintained. These are prerequisites and the first approach by local authorities and industry to a problem of potentially excessive emission is to satisfy themselves that these conditions pertain. There is not much point in carrying out elaborate measurements of grit and dust emission if the plant is inefficiently operated and in a bad state of repair, or if the equipment for arresting grit and dust provided by the owners of the plant is not used properly. These shortcomings must first be rectified.” It is emphasized that the standard is not of a simple “pass/fail” nature and should not be applied in this way but in a common-sense way having regard to all the circumstances.

Where no prescribed limit of emission is applicable it will be an offence if the occupier fails to use “any practicable means there may be for minimizing the emission of grit and dust from the chimney”.

“Practicable” and “practicable means” are defined in the principal Act and require regard to be had, amongst other things, to local conditions and circumstances, the financial implications and the current state of technical knowledge as well as the provision and maintenance of plant and its proper use.

Where emissions are gross and obvious the traditional greased glass plate and information about the existing arrangements and their use should be capable of providing adequate evidence as to whether the existing arrangements and performance are adequate.

## **Miscellaneous Provisions**

### **Chimney Heights**

Under the new section 6 when:

- (i) a new chimney is built to serve a new or existing furnace;
- (ii) a furnace served by an existing chimney is enlarged, i.e. when its combustion space is increased;
- (iii) a furnace served by an existing chimney is removed and replaced by one having a larger combustion space;

the occupier of a building, or the person having possession of a boiler or industrial plant commits an offence if he uses the furnace without having obtained the approval of the local authority for the height of the chimney; or if he fails to comply with one or more conditions subject to which approval has been conferred.

If the local authority fail to give the applicant a written determination of his application within four weeks it is deemed to have been approved without qualification unless a longer period has been agreed with the applicant in writing.

In some authorities, proposals are subject to approval by the Health Com-



mittee and then to confirmation by the Council. In these circumstances, to ensure a decision within four weeks, it would be an advantage if the power to approve chimney heights was delegated to the Health Committee.

In referring to the guidance on heights given in the Ministry publication "Chimney Heights" the Explanatory Memorandum comments that "The 1967 version recognizes that emissions of sulphur dioxide below 3 lb. per hour are trivial and do not involve special consideration of the question of chimney height". It is true that such small emissions are negligible so far as sulphur dioxide is concerned, but in the writer's experience some small installations burning 35 seconds oil can give rise to nuisance from odour and accordingly the chimney height for such an installation is best determined with regard to the surroundings rather than the sulphur dioxide emission.

An approval under this section may be granted without qualification or subject to conditions as to the rate or quality, or the rate and quality, of emissions from the chimney. A normal condition relating to "rate of emission" would require that a given rate of emission of, e.g. sulphur dioxide should, not be exceeded. The operator might be in breach of the condition if, for instance, he used a different grade of fuel with a higher sulphur content or brought standby plant into regular use to supplement the plant which had been taken into account in the assessment.

As the parameter " $\text{SO}_2$  emission Lb./Hour" is used in "Chimney Heights" it appears to be appropriate for use in specifying a condition of this kind. Presumably, in any proceedings for a breach of such a condition, evidence as to the amount and sulphur content of the fuel actually being used in the plant would be acceptable as proof that the rate of emission was being exceeded and the actual sulphur content of the emission would not have to be measured.

Section 13(2) defines "rate of emission" by reference to the quantities of the substance in question which may be emitted during a given period and accordingly it would appear that a condition seeking to prescribe the efflux velocity would not be acceptable.

There may be cases where limitation of the *rate* of emission does not sufficiently insure against excessive pollution by products other than those normally associated with the combustion of a conventional fuel. In such cases conditions may be imposed as to the *quality* of the emission.

As examples of cases in which a condition on concentration may be appropriate the Explanatory Memorandum gives:

- (a) where certain waste gases from the combustion of material which is not a conventional fuel (e.g. chlorinated or sulphur-bearing compounds) are discharged from the chimney, whether or not mixed with other waste gases,
- (b) where certain waste gases from a non-combustion process are discharged from the chimney mixed with gases from a combustion process.

It also mentions some processes such as those involving the treatment of metals where the density of the emission can depend on the type of raw material being heated, e.g. clean or dirty scrap, pig-iron or steel, high or low zinc alloys, and suggests that it may be appropriate to place some limit on the density of the emission by reference to optical density or percentage obscuration, and that the Bacharach Scale may be suitable in many cases.

If the local authority refuse approval of the proposed chimney height or attach conditions to their approval they must inform the applicant in writing, stating their reasons, and in the case of a refusal stating the lowest height which they



would be prepared to approve, either unconditionally or subject to specified conditions. The applicant then has a right of appeal to the Minister.

Section 6 (II) gives the Minister a discretionary power to exempt certain kinds of boiler or plant from the provisions of the section. Such exemption would seem to be appropriate only for installations which are of a temporary nature or for purposes of investigations and research.

The measurements made as part of the National Survey of Air Pollution indicate that chimney heights determined in accordance with the guidance given in "Chimney Heights" are adequate to prevent prejudice to health or nuisance from emissions of sulphur dioxide. There is no longer any exemption, as there was under section 10, for residences, shops or offices, and it is in this context that contention seems most likely to arise with architects as to the aesthetic desirability of chimneys projecting past the tops of tall imposing prestige buildings. Clearly it would be ludicrous to apply the  $2\frac{1}{2}$  times rule or the normal corrections for building height to very tall buildings. In such circumstances the best guide seems to be "not less than 10 feet above the ridge" but there will, no doubt, be a good deal of discussion about how far a chimney needs to project above a flat roof to avoid the risk of downwash, and about the effectiveness of devices like the "Handley Page Slot" or Venturi-type terminals as alternative means to ensure that emissions clear the negative pressure areas over the roof and in the lee of a building.

A developer may secure approval for a lower chimney height by undertaking to use a low sulphur content fuel but there is no certain guarantee that adequate supplies of low sulphur fuel will continue to be available. Some difficulty has already been experienced in this regard due to the interruption of certain grades as a result of the Arab/Israeli and the Nigerian wars, and despite the given guidance that the known sulphur content of the proposed fuel should be used in the chimney calculations there is some justification for one oil company's view that "the chimney should be designed for the products of combustion of heavy fuel oil unless there is absolute certainty that this grade will never be used".

The problem of new chimneys for low buildings where there are much taller buildings nearby remains difficult to resolve.

In practice it is quite common for developers to ask the local authority what chimney height would be required so that agreement may be reached before the proposals are submitted formally. The emission of sulphur dioxide is only one of several factors which may need to be considered but, in general, despite the problems which have been mentioned it is not normally excessively difficult to determine what the height should be and to secure the developer's agreement.

### **Acquisition and sale of unauthorized fuel in a smoke control area**

The new powers under section 9 will, at long last, enable action to be taken against the minority of irresponsible fuel suppliers who sell bituminous coal to householders in smoke control areas. Such sales, although accounting for only a minute proportion of the fuel used in the areas are an embarrassment to the bona-fide fuel merchant by reducing his proper trade in smokeless fuels, to the local authority by bringing smoke control into disrepute, and to the householder by making him liable to prosecution. Almost invariably the sellers are itinerant vendors, known colloquially as "cowboys" who sell poor coal at high prices, usually at night time or at weekends. Prompt application of the new power should discourage flagrant offenders. To avoid genuine mistakes it is advisable that the local merchants should be given up-to-date information about the extent



of smoke control areas and this can usually be arranged most conveniently through the Coal Merchants Federation.

### **Prohibition of dark smoke from industrial or trade premises**

Apart from domestic smoke the most serious outstanding source of low-level smoke in towns is probably that arising from the burning of waste in the open in such places as car breakers' or scrap merchants' yards. The existing nuisance provisions are slow, cumbersome and weak, and it is to be hoped that section one of the new Act will be brought into operation by the Minister as soon as possible.

In November, 1954, the Committee on Air Pollution reported that the most serious immediate problem to be tackled was visible pollution by smoke, grit and dust, and that the objective of their recommendations was that by the end of 10 to 15 years the total smoke in all heavily-populated areas would be reduced by something of the order of 80%. Judged by that yardstick progress has been slow, but in general the provisions of the 1956 Act were adequate and considerable reductions in pollution have been effected. The new Act contains useful provisions to secure further abatement of air pollution; some of them will not be easy to apply; the work is becoming more technical, more voluminous, and in some respects more onerous. There is no cause for complacency but the results achieved so far are encouraging.

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Manchester Cathedral after cleaning—picture sent by a reader



# CLEAN AIR AWARDS

Starting in 1970 the National Society for Clean Air will make awards every two years for contributions to the cause of clean air. These awards will be made to individuals, industry and local government authorities.

The awards will take the form of a medal to all three classes, a plaque of the emblem of the Society for use by local authorities, a suitable emblem for use on stationery by industries.

## RULES FOR AWARDS

### 1. General

(a) Generally, awards will be limited to the United Kingdom. Under certain circumstances, however, a special international award might be made for a particularly outstanding achievement anywhere in the World, including, of course, the United Kingdom, from time to time.

Awards will be made in three classes:

- (a) Individuals
- (b) Industry
- (c) Local Authorities

### 2. Timing of Awards

(a) All three classes will be considered together.

(b) Awards will normally be made at two-yearly intervals, and will be presented at the Clean Air Conference in October of the year in which they are made.

(c) The first awards will be made in October 1970. In the first instance, however, in order to recognize what has been achieved hitherto, awards will be made for achievements in the 15 years from 1 January, 1955 to 31 December, 1969.

(d) Entries and recommendations for awards for the 15-year period should reach the offices of the Society not later than 31 March, 1970.

(e) The next awards will be made in 1972 for the period from January 1970 to December 1971 and entries will be required to reach the Society by 31 March, 1972, and so on.

### 3. Entries and Applications

(a) Any individual, industry, works, etc., or local authority may enter, i.e. individuals, firms, local authorities, etc., may propose themselves for an award.



(b) Entrants do not necessarily have to be members of the Society.

(c) Members of the Society and Divisional Councils of the Society may make recommendations for awards.

(d) Informed outside sources such as the Institute of Fuel, the Alkali Inspectorate, the Standing Conference, etc., may make recommendations for awards.

(e) Applications for awards should give a concise statement of the achievement and should include a brief summary. Six copies of the application will be required by the Society.

(f) The responsibility for making initial applications rests completely with the particular industry, works, etc., local authority, individual, informed outside source, Division or member of the Society; the Society accepts responsibility only for making a balanced assessment of all the information which becomes available.

(g) The judges reserve the right not to make an award if they consider the necessary standard has not been reached. Similarly, entries which do not qualify for an award, but which may in the opinion of the judges qualify for an award at some later date, may be carried forward.

(h) The panel of judges will make recommendations for the awards to be made to the Executive Council of the Society who will have the final decision.

(i) The Society reserve the right to change any of the rules regarding Clean Air Awards in the light of experience.

#### **4. Individual Awards**

(a) It will generally be necessary to exclude those persons professionally engaged exclusively on clean air work, e.g. Alkali Inspectors; but those persons such as Public Health Inspectors who have other duties to perform as well as those in connection with clean air, will be eligible.

(b) Notwithstanding (4a) above, very exceptionally, it may well be necessary to consider the work of the "Professional" who makes some outstanding contribution in the form of a major break-through.

(c) It will, at times, be necessary for the judges to be retrospective and to recognize what has been achieved by a "Professional" during his lifetime's work. It may be fitting that an award is made to such a person, for example, on his retirement.

(d) The judges also recognize that sometimes work done in the past does not come immediately to fruition, or its effect is not properly appreciated, until some time has elapsed. This will be taken into account when making awards.

(e) It is recognized by the judges that individuals may hesitate to put themselves forward for an award and that therefore in the case of individuals it is most important that those who are aware of their work, e.g. Learned Societies, Local Authorities, Divisional Councils of the Society, etc., should put forward the names of people for awards.

(f) The judges recognize that, especially when considering the awards to be made in the first instance for the period of 15 years, it is likely that a number of names of those who have given long service to the cause of clean air may be put forward. The judges appreciate that such work might well be worthy of recognition and might recommend to the Executive Council that certain of them should be considered for Honorary life membership of the Society as an alternative to an award.

## **5. Industry**

(a) For the purposes of making an award, industry will be deemed to comprise the following classes:

- (i) Those who make direct contributions in control of their own emissions.
- (ii) Developers of processes or constructors of equipment which controls or reduces emissions.
- (iii) Developers and makers of instruments (particularly those used for measurement of emissions).
- (iv) Industries who have rendered services to the public in general by undertaking surveys in connection with air pollution, etc.
- (v) Trade Associations and Research Associations.

(b) The judges recognize that sometimes work done in the past does not always come to fruition immediately or its effect is not properly appreciated until some time has elapsed. This will be taken into consideration when making awards to industry.

(c) An award may go to an industry as a whole, a large combine such as I.C.I. or C.E.G.B., or to a works or part of a works. Similarly, an award made to industry may be coupled with a name of a particularly individual who is a member of the firm and who has been largely responsible for the achievement.

## **6. Local Authorities**

(a) For the purposes of awards, the term "local authorities" shall include local government authorities in the generally understood sense together with such bodies as local clean air councils and committees.

(b) Awards will not be made for the progress in smoke control alone; but when consideration is being given to the achievement of a local authority, the control of other processes in the area of the authorities concerned, which are outside the Alkali Act, will also be considered. Similarly, special projects will also be given suitable consideration.

## **7. Method of Judging**

(a) All entries shall be sent to the offices of the Society where they will be given a preliminary scrutiny to see that they contain the requisite information and that the recommendation or application is clearly set out. In the event of more information being required, the Director of the Society shall obtain this immediately.

(b) As soon as the necessary information has been collected, copies of all applications or recommendations will be sent to the judges who will make their own preliminary selections. Should any judge require further information, they will obtain this through the Director.

(c) Once the preliminary selections have been made and communicated to the Director, the panel of judges will meet as requisite to make the final selection and subsequent recommendations to the Executive Council. The first meeting of the panel of judges will be held about a month to six weeks after the closing date for the awards, depending on circumstances.

(d) The final decision regarding the awards shall be made by the Executive Council at their meeting held immediately before the annual conference in the year the award is to be made. The panel of judges shall therefore make their recommendations to the Council at an appropriate time before this meeting.



# Conference on Vehicle Pollution

## Junior Chamber of Commerce

Mr. Robert Maxwell, M.P., gave the opening address at the one-day conference held on 21 November, 1968, at the May Fair Hotel, London, and organized by the Junior Chamber of Commerce for London who had invited some of the most authoritative speakers to consider the various aspects of this problem.

Mr. Maxwell, as sponsor of the Clean Air Act 1968 expressed his regret that this Act did not deal with pollution caused by motor vehicles, but not enough was known about the problem to legislate against it. He challenged the research workers' assertion that they did not need any more money for examining that aspect of pollution. The average citizen was horrified by the pollution in London streets. Official complacency on this subject, thought Mr. Maxwell, was "incredible" and road pollution had to be tackled more vigorously **now**.

It had been forecast that in the next ten years the present vehicle population in Britain of 16 millions would be doubled. But it was already estimated that each year the existing vehicles discharged to the atmosphere eight million tons of carbon monoxide, one million tons of nitrogen oxides, two million tons of hydrocarbons and considerable amount of lead compounds, sulphur oxides and particulates. Yet the experts claimed that such figures were not significant, since concentrations at breathing levels were not dangerous to health. Mr. Maxwell said that the Government, industry and the researchers would neglect this problem at their peril. He paid tribute to the good work of the Medical Research Council, but it should be more concerned about this problem than it was, and more brains were required in research and universities to apply themselves in this field. "The people of this country deserve and will require an improvement in the quality of life in this overcrowded island", concluded Mr. Maxwell.

**Professor P. J. Lawther** (Director of the Air Pollution Research Unit of the Medical Research Council) declared that vehicle pollution should be looked at clearly and without hysteria. Politicians would not win the day if they used "phony" arguments to press their case.

Medically speaking, what mattered was how much was taken into the lungs. It was misleading to confuse total emission with ground-level concentrations when discussing health hazards. Professor Lawther showed a series of slides, based on research work on air pollution at the Medical Research Council, which he said, demonstrated that among policemen, professional drivers and others working among vehicle fumes, the amount of CO in their blood was affected by whether the subjects were smokers or not.

With regard to lung cancer, stated Professor Lawther, one could forget about

it when considering the question of vehicle exhausts. There was no amount of cigarette smoking which was not without its effect on this disease. One should not quote the possibility of lung cancer as an argument in favour of reducing air pollution from vehicles. "Just say they stink and you do not like the stink. That is a good reason for doing something about it." That might be the reason for removing hydrocarbons, but not on account of health. The amount of oxides of nitrogen was very low, while the question of lead was being kept under review. Studies in the U.S.A. so far showed that the amount of lead getting into human organism was not alarming. The maximum concentration measured in Fleet Street had been 4 microgrammes per cu. metre (the allowable limit was 200 microgrammes per cu. metre). In their research work, Professor Lawther said they were continually on the look-out for other "exotic" pollutants. He was not saying that motor vehicles did not produce unpleasant emissions, but facts had to be faced and problems beaten with the right stick.

**Mr. D. Gilbert** (Imperial College, London) spoke about the traffic aspects of motor vehicles. They contributed to the deterioration of urban environment and pollution was only one of the undesirable environmental effects and it was important that solution to air pollution did not aggravate these effects.

Mr. Gilbert showed slides and discussed the estimated growth in the number of vehicles in the future (40 millions by the end of the century) and the increase in fuel consumption and of exhaust emissions. He said that one-third reduction in emissions would be possible at present by legislation, but if we waited until 1975, the existing emissions would be almost doubled. One important factor was that more traffic and carbon monoxide were being introduced in residential areas.

Among measures advocated by Mr. Gilbert were traffic management schemes and the keeping of traffic out of residential streets, and modifications to vehicles themselves. Efficient road systems and more public transport would also be required, while some proposals such as monorails and continuous moving platforms might be of possible future interest.

Although road vehicle pollution might not be a hazard to health, it was unpleasant, and an intolerable situation, the remedy to which lay in our hands, concluded Mr. Gilbert.

The motor manufacturer's view was put forward by **Mr. H. P. Dancocks** (Chief Development Engineer, British Leyland Motor Holdings Ltd.) who gave a full account of developments in the U.S.A. from the technical and legislative points of view. In Europe, motor manufacturers had recommended to the Economic Commission for Europe that there should be common test procedures for the whole of Europe. The Working Party that had subsequently been set up, has finally agreed on a European test cycle and it now remained to be seen, said Mr. Dancocks, how the various Governments would use it.

**Dr. S. R. Craxford** was the last speaker and his subject was "Pollution in Towns". He agreed with Professor Lawther about the harmlessness of vehicle exhausts, but there *was* the question of stink and since action on air pollution matter would in the future turn on amenities, that stink had to be eliminated. When compared with the rest of the air pollution problem, pollution from motor vehicles was comparatively small and accounted for less than 10% of the total. As far as diesel exhausts were concerned, only administrative action remained to be taken, as had been done in Belgium and that could be done without ruining anyone.



In his survey of pollution in general, Dr. Craxford stated that since 1952, the emission of smoke had gone down more than 50%, and the very marked reduction in industry was due to the fact that industry had been modernizing itself anyway and the Clean Air Act—which also contributed to the improvement—swam with the tide. 80% of smoke still came from domestic chimneys, but because of various modern developments, Dr. Craxford thought there would be very little domestic smoke in ten years' time. Regarding sulphur dioxide, he said that we were now past the peak of SO<sub>2</sub> emissions and the figures were now going down, in spite of more energy that was being consumed. In fact, Dr. Craxford's theme was that the whole tide of this country would reduce pollution by itself and that legislation would serve to speed up this process.

Copies of the speeches will be available shortly at £1 each from Mr. P. G. Knatt, 13 Gaynes Road, Upminster, Essex. (Telephone: 583 7133 or Upminster 24970.)

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## **The Royal Society**

### **Recent Research in Air Pollution**

On 14 November, 1968, the Royal Society held a meeting for discussion on Recent Research in Air Pollution. The meeting was organized and chaired by Dr. J. S. Forrest, F.R.S. and Dr. B. J. Mason, F.R.S. and 14 papers were presented and discussed.

The papers fell into six main sections: air pollution measurements, meteorological aspects of air pollution, mathematical analysis of chimney plumes rise and dispersion, recent results of measurements, worldwide dispersal of pollutants and reduction of emission of pollutants.

Authors from Czechoslovakia, Germany, Italy and the United States as well as from the United Kingdom read papers in which the latest ideas and developments in their respective fields were discussed. From Dr. P. M. Hamilton of C.E.R.L. (U.K.) we learned of the application of a pulsed-light rangefinder (lidar) to the study of chimney plumes: Dr. M. Pagliari of Rome described the use of pilot balloons to obtain information about the movement and layering of the lower atmosphere at three power stations in the Po valley, while Dr. G. A. Briggs of Tennessee discussed the use of formulae for the calculation of optimum plume rise. Professor W. Klug of Damstadt discussed new factors to be used in the determination of chimney heights, and Dr. J. Bettelheim of Prague outlined some of the serious air pollution problems peculiar to Czechoslovakia. Returning to more practical considerations, Mr. H. J. Lowe of C.E.R.L. described the latest developments in electrostatic precipitators and the troubles to which they were prone, and Mr. H. G. Masterson also of C.E.R.L. discussed the various processes, by no means entirely successful, proposed and sometimes used to limit sulphur emission from combustion processes.

As was to be expected, the papers were original in concept and of high technical merit. It was a very full day indeed which made one think—and left one in no doubt that in spite of recent advances and the considerable amount of research that is going on, there is still a very great deal to be done to obtain clean air.

# Pollution from Road Vehicles

**Symposium held at the Institution of Mechanical Engineers, London, 25 and 26 November, 1968.**

This symposium, organized by the Institute of Petroleum and the Automobile Division of the Institution of Mechanical Engineers, encompassed 18 technical papers on pollution from petrol-engined and diesel-engined vehicles and proved to be, perhaps, the most important meeting of its kind ever held in the United Kingdom on this subject. The papers were of the highest quality and covered a wealth of original work. Most of the people engaged on this work were present for both formal and informal discussions.

In the chair was Mr. T. Martland of the Ford Motor Co. Ltd., of Basildon, Essex. Mr. Martland is the Chairman of the British Technical Council of the motor and petroleum industries of the United Kingdom; this Council was instituted in 1963, and its two main committees deal with lubricants and fuels respectively. Similar bodies have been organized in seven European countries and they co-ordinate some of their activities with the B.T.C. and have formed the Co-ordinating European Council (C.E.C.).

The British Technical Council has defined the problem of air pollution from road vehicles and its significance very succinctly as follows:

- (a) Existing legislation in the Western and non-Communist world, other than in California, at present imposes negligible restrictions on the gasoline engine, but shows indications of imminent action.
- (b) Legislation in many countries is so framed that regulations against emission from gasoline vehicles could be enforced without major revisions. This is most apparent in recent revisions of legislation in Ireland, France and Belgium.
- (c) A number of countries have legislation which requires health ministries to monitor and report on pollution in relation to public health.
- (d) Although few details of legislation are available, the Communist world appears to be more restrictive to automotive emissions than the Western world. It is also evident that the number of motor vehicles in the Communist countries is such that they produce negligible pollution.
- (e) The very many medical investigations of the components of vehicle emissions lead to few conclusions relevant to acceptable limits of emission.
- (f) Government and public bodies throughout the world are keen to exchange information and harmonize legislation, but recognize the impossibility of uniformity of legislation. Differences in atmospheric conditions and customs, as well as legal and constitutional differences, are factors which mitigate against uniformity.
- (g) In the overall total of contributors to atmospheric pollution, the gasoline engined vehicle is a minor one in the majority of locations, but gains in significance because it emits its pollutants at low level and because of its rapidly increasing rate of use.



- (h) Town planning to limit the effects of industrial pollutants in population centres draws more attention to the gasoline-engined vehicle as a pollution source; but in its attempts to plan the avoidance of traffic congestion, planning will contribute to the reduction of pollution from this source.
- (i) If and when existing legislation in the U.K. is successful in controlling pollution from industrial and domestic sources, more attention must inevitably focus on the motor vehicle.
- (j) The gasoline-engined vehicle is a major contributor of the following pollutants: carbon monoxide, unburnt hydrocarbons and oxides of nitrogen. Of these, carbon monoxide is certainly the most undesirable. Oxides of nitrogen may be more damaging in respect to chronic exposure, but evidence is limited. Unburnt hydrocarbons in vapour form appear significant only in relation to photochemical smogs. Heavy hydrocarbons in association with non-particulate matter, like oxides of nitrogen, have possible significance in relation to effects of chronic exposure.
- (k) The use of lead in gasoline appears to have minor significance as a health hazard in respect to its pollution of the atmosphere.
- (l) Major attention should be immediately devoted to the reduction of carbon monoxide emission from automotive vehicles.
- (m) In the interests of clarifying the situation and as a safeguard against possible legislation of an unnecessarily restrictive nature, the motor and petroleum industries should support research into the significance of such emissions as oxides of nitrogen and heavy hydrocarbons and methods of reducing these.

The above conclusions are worthy of careful study and would appear to be well founded. Conclusions (i) and (l) are perhaps of particular significance to the N.S.C.A.

There is no doubt that the need for the European and U.K. motor industries to conform with the Californian requirements, in order to export their wares, has been responsible for this enormous and unanimous volume of research and development work, thus illustrating what legislation can lead to.

It is necessary to draw a line between the wealth of technical information now available on the one hand and the end effect on air pollution on the other; there is so much technical data now available and the subject is so well understood, that suitable legislation in the U.K. and Europe, for a reasonable reduction of carbon monoxide emission (not as severe as the U.S. level) could force the industry (at present quite willingly) into reasonable action within a reasonable period of time.

There is a small undercurrent of opinion that there is no proof that action is necessary and that individual manufacturers will act of their own accord when they are ready. There are others who rightly insist that the U.K. (or any other country) should not take unilateral action; but almost all are now of the opinion that legislation is bound to come.

From brief discussion with I.Mech.E. members of the Ministry of Transport at the Symposium it appeared that they subscribed to the view in the last sentence so that they would be unwilling to contemplate any U.K. legislation until the whole of Europe is ready to do likewise.<sup>1</sup>

Although four papers were presented on the problem of exhaust from diesel-engined vehicles, none of them tackled the subject of keeping smoke emission

from existing engines to an acceptable level, nor indeed, was such a level defined. One paper, very rightly, was on the subject of engine design for maximum power output at reasonable levels of exhaust pollutants. Another was on smoke measurement; in our view a useful research and development tool, although not so necessary for legislative road assessment technique. There was a further paper on the influence of diesel fuel properties. This is a problem for the petroleum industry as also is the subject of the last paper on additives to diesel fuel for smoke suppression.

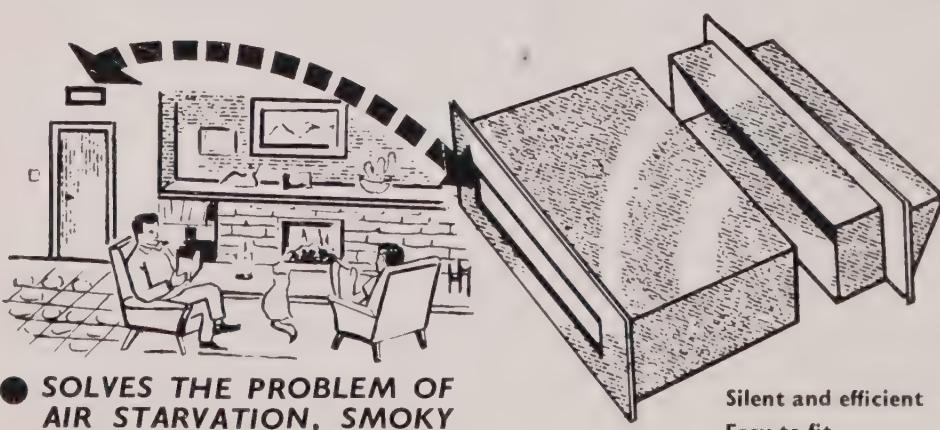
In order to test the feeling of the meeting, the NSCA proposals for legislation to provide for a greater margin between smoke limited engine output and makers pump setting output that is provided by the current B.S.I. Specification, were raised. Although a number of speakers referred to this, none insisted that the B.S.I. Specification was adequate for the purpose.

The discussion was perhaps disappointing with such a galaxy of talent present, but the reason was undoubtedly the veracity of the subject matter which left little room for argument or constructive criticism. In summing up, it would appear that the way is clear, subject perhaps to minor adjustments, for legislation to be drafted for the United Kingdom and Europe which would result in the reduction of carbon monoxide from petrol-engined vehicles to an acceptable level, and for the virtual elimination of smoke from diesel-engined vehicles.

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### **The Clean Air Act 1968 (Commencement No.1) (Scotland) Order 1968**

By a statutory instrument made on 4 December, 1968, by the Secretary of State of Scotland, 1 April, 1969, has been announced as the date on which sections 2, 6 and 8 to 15 inclusive, together with Schedule 1 (with the exception of paragraphs 2, 5, 8, 9 and 11) and Schedule 2 of the Clean Air Act 1968 will come into force in Scotland.



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# Clean Air Congress and Exhibition

## Dusseldorf, 13 - 17 October, 1969

The Society has now completed the task of approaching its members and friends in industry regarding their participation in the Joint Venture Stand to promote clean air equipment manufactured in Britain. The Ministry of Technology are giving their full support to the venture and are planning an exhibit occupying 500 square feet of space. Lodge Cottrell Ltd., pioneers in the field of electrostatic precipitators are joining forces with other members of the Simon Engineering Group to stage a display occupying 400 square feet.

Others taking part include Airflow Developments Ltd., High Wycombe, F. E. Beaumont Ltd., London and Wilts., C. F. Casella & Co. Ltd., London, The Crystal Tack Cloth Co., London, Drummond Dust and Fume Extractors Ltd., London, Johnson Matthey Chemicals Ltd., London, Tilghman Wheelabrator Ltd., Altrincham, Universal Machinery and Services Ltd., Leeds. When full details of the exact scope and nature of the exhibition have been received from the organizers, Nowea, it is expected that many other members and friends of the Society, already interested will commit themselves to participating in this venture which it is hoped will ensure the greater use of British clean air equipment in Europe.

The Congress being convened by Verein Deutscher Ingenieure, Kommission Reinhaltung der Luft, will deal with:

European Clean Air Legislation; The Traditional Fuels and their Significance in Atmospheric Pollution; Air Quality Control; Clean Air and Street Traffic; Technical Possibilities of Reducing Undesirable Exhaust Components; CO and CH Emission Values reached so far; Influence of Fuels on Motor Emissions; Problems of Reduction of Sulphur Content in Flue Gases and SO<sub>2</sub> Emissions; Desulphurizing of Gases with the Acid Sulphate Processes—results and costs; All Aspects of Chimney Siting, Height, Diameter, Outlet, Lagging, etc.; New Developments in Dust Measurement and Gas Measuring Technology; Statistical Problems Relating to the Measurement of Pollutants and Planning of Measurement; New Methods of Dust Measurement; Cleaning of Flue Gases; Ways and Means for the Reduction of Dust Emissions in Collieries; Reduction of Emissions in the Wood Pulp Industry, Viscose Industry, Metal Works and Smelting Works and in the Incineration of Refuse; The Fight against Odours; Ways of Reducing Emissions from Domestic Fires through Introduction of District Heating, Gas Heating, and Electric Heating; Improvements in Fuels; The Factor of Temperature in the Degree of Separation of Various Dust Removing Apparatuses; The Formation of Acid Mists and a New Process for its Removal by Filtration through Wet Fabric; Droplet Separation from Flow Gases.

In addition, invitations to give papers have been extended to Dr. S. R. Craxford of Warren Spring Laboratory and Mr. A. Archer, Chief Public Health Inspector of Halesowen. Authors will come from various European countries as will a large representative delegation.

The British Non-Ferrous Metals Research Association is showing great interest in Dusseldorf and inquiries coming into Field House from many sources emphasize that the impact of this Congress and Exhibition will extend far beyond the borders of the host country, Germany.

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## **The High Cost of Electric Cars**

Electric family cars could be on the roads in 10 to 20 years . . . if enough technical effort is made, if nations consider that cleaner air is worth the high cost of research and development, and motorists will pay much more for their cars.

A report on the prospects for electric vehicles prepared for the United States Department of Health, Education and Welfare, National Centre for Air Pollution Control, by the Arthur D. Little research and management consulting organization, warns that a vast amount of technical effort will be necessary. The report states: "The technical risks of this endeavour are too great for the investment to be borne by private capital alone, particularly since the major objective is a technology desirable for its social good rather than for its profit potential".

The report studies six types of electric vehicle: the six-seater large family car, a four-seater 'commuter car', a small utility car, a delivery van, a taxi and a city bus. Various types of electric power sources are compared and it is concluded that for the family car of the future, only high-temperature alkali-metal batteries (needing years of research work to develop—and probably weighing around 900 lbs) will be suitable. They would also be best for the commuter car, delivery van and taxi. If lightweight construction was used for vehicles, metal air batteries would serve all except the family car. The lead-acid battery could power a lightweight utility car. The fuel-cell system is not favoured because of complexity and cost, but its much simpler method of refuelling would be a major advantage.

On charging batteries, the report says this is best done slowly over a period of four to eight hours at home or by metered outlets at parking points. Rapid recharge, in, say ten minutes, would require a power source of about one megawatt output and raise cost and safety difficulties. The complete conversion to electric vehicles in the United States today would raise electricity consumption by about 40%.

For long trips motorists would have to exchange batteries—which might be hired—at service stations.

It is calculated that an electric family car in the United States would cost about £420 more than its present-day petrol-engined counterpart.

Surveying electric vehicle development in various countries, the report comments: "In Europe, petroleum-based fuels are taxed more heavily than in the United States and as a result there is proportionately greater incentive to use electric vehicles".

Listing some of the work done in Britain by the Electricity Council, Shell Research Ltd., Scottish Aviation and others, the report analyses the specifications of five British electric vehicles with maximum speeds of from 30 to 41 m.p.h. and ranges of from 28 to 40 miles.



# News from the Divisions

## Yorkshire

A meeting of the Yorkshire Divisional Council was held at Midland Rexco Limited's Works, Ollerton, on Monday, 2 December, 1968, at 11.30 a.m., when a full agenda was discussed by the 20 members present with Mr. A. C. Saword in the Chair.

After lunch at the kind invitation of the National Carbonising Co. Ltd., the Divisional Council joined 55 members for an Open Meeting. Mr. Saword, the Chairman, said he would like to offer his thanks to Mr. Kershaw for the wonderful hospitality received and for the excellent and very instructive tour of the works during the morning. Rexco had been manufactured for a great many years but the modern plant was far superior to the original one and it was very encouraging to see how free from smoke, fumes and grit the atmosphere was. There were still many people in the country who preferred an open fire and smokeless fuels such as Rexco ensured there would be no difficulty in catering for their needs. Mr. J. Kershaw, General Manager of the National Carbonising Company Limited, said it was a pleasure to receive the members of the Yorkshire Division and also to welcome members of the Southwell R.D.C., and then gave his address on "Progress in Coal Carbonization".

The basic patent covering the Rexco process of low temperature coal carbonization was filed in the United States in 1922 by two engineers named Davis and Wallace. Although originally developed for the treatment of oil shale, the retort was soon adapted to the treatment of non-coking coals. Wallace's British patents passed into the hands of National Carbonising Co. Ltd., in 1937. Whilst there was short-term operation of experimental Rexco plants in the States during the late 20s, it was left to the Coal Research/National Carbonising set-up to commission and develop the first commercial Rexco plant—two retorts at Mansfield from which Rexco was first produced in October 1934. These original two retorts have been in more or less continuous operation since those pioneering times 34 years ago.

It was paradoxical that in 1939 the Americans recognized the success of a process developed in this country from the original U.S. Patent. The State of Utah commissioned an enquiry into low temperature coal carbonization "to meet the need for a fuel that would solve the smoke nuisance of Salt Lake City and nearby towns and at the same time be an important factor in re-establishing Utah's coal industry on a sound economic basis". The conclusion of the Commission's Report, 872 pages long, read "the most suitable process for the manufacture of semi coke from non-coking bituminous Utah coals are the Rexco and N.F.C. processes".

In Britain realistic expansion of Rexco production began in 1956—the year in which the Clean Air Act was passed. Then onwards the Clean Air Movement and Rexco have been closely related; the growth of both having snowballed since 1956.

Since 1964 there have been two important happenings in Rexco manufacture;

first, the commissioning of the plant alongside Ollerton Colliery; and second, the commissioning of a new design of retort for making Rexco by a continuous process—this at the original Rexco site adjoining Mansfield Colliery.

Mr. Kershaw claimed that the new plant could be erected in small package type units wherever suitable coal was available. It was, contrary to any other coal carbonizing plant known to him, completely free of any inherent air pollution nuisances. Rexco had had their share of embarrassments from these nuisances. Their earlier orthodox installations came under heavy fire from several authorities concerned with clean air. By spending substantial sums of money and leaving no stones unturned in technical investigations, his Company had been able to improve standards considerably. He said he hoped that he was not being too bold in suggesting that his Company was now an acceptable, perhaps even a welcome industrialist in the Mansfield district, and claimed that his Company contributed handsomely to the well-being of the coal industry in north Nottinghamshire.

Thoresby and Ollerton Collieries were two of the top collieries in the country, both with saleable outputs comfortably in excess of one million tons per year. Nearly all the coal of 1 inch size upwards from these collieries was purchased by Midland Rexco Limited in the same regular tonnages week after week, with assurance of this continuing for many years. How envious many other collieries and other Coal Board areas must be of this pattern of customer demand. Not so long ago the National Coal Board stated that for every 400 tons of coal lost in the market per year one of their employees became redundant. Rexco was therefore playing an important part in maintaining jobs in the mining industry by its processing of 750,000 tons of coal per annum, a tonnage which can be equated to the employment of 1,850 N.C.B. workmen.

Support for the community did not end with the purchase of coal. National Carbonising Company plants provided employment for about 300 people from the locality. To supplement the large Rexco tonnages moved by rail and so provide a complete service to merchant customers there was, from an early date, an entry into road haulage. This important subsidiary, N.C.C. Plant & Transport Limited, centred at New Ollerton, now operated 200 vehicles and provided employment for a further 180 people. Each year over 60,000 tons of tar were carried by their own transport to tar distillers in Yorkshire. Plant hire and excavating machinery interests were two of the off-shoots of the transport concern, with other activities, including container traffic on the way.

Plans for increasing the manufacture of Rexco were already on the drawing board and Mr. Kershaw hoped that in the reasonably near future the likelihood of Rexco being produced somewhere in the Yorkshire coalfield would be under active investigation.

Discussion followed Mr. Kershaw's talk. Alderman Fisher of Ossett asked for an explanation about the low cost of Rexcobrite as he had been given to understand during the morning visit that this would cost about £9 per ton. Mr. Kershaw replied that they were producing an alternative grade of fuel called Rexcobrite. With the closure of so many gas works and the gas coking supplies that went with them it was felt that they should find a fuel that was as competitive in price as gas fuel. By reducing the average size of Rexco nuts they could bring the price down to that of gas coke. Rexcobrite was intended for the closeable appliance market and not the open fire. Supplies could be extended throughout the country due to the shortage of the smaller type of fuel.



Mr. E. J. Winfield, the Deputy Chairman, said that it gave him great pleasure to thank Mr. Kershaw and all the members of Midland Rexco for their hospitality. Mr. Kershaw's talk had been an excellent finale to an interesting day. He had personal experience of using Rexcobrite in a boiler and also used Rexco as an open fire fuel and thought it burned extremely well. Although Mr. Saword had given his thanks on behalf of all the members attending, Mr. Winfield wanted to add his own personal thanks especially for the excellent talk given by Mr. Kershaw.

*J. Goodfellow, Hon. Secretary*

## East Midlands

A most rewarding whole-day meeting attended by 63 members of the East Midlands Division was held at Peterborough on 29 October by kind invitation of the Peterborough City Council and Messrs. Perkins Engines Limited. Members assembled at the Town Hall, Peterborough where an official welcome was extended to them by the Mayor of Peterborough, Alderman A. W. L. Adams. In his address of welcome, the Mayor referred with justifiable pride to Peterborough as a clean city, but he stated that the City Council was intent on making it still cleaner by the extension of smoke control areas already established. He referred to the pollution which used to come from British Railways but stated that this had now almost disappeared and the city and its buildings were cleaner in consequence.

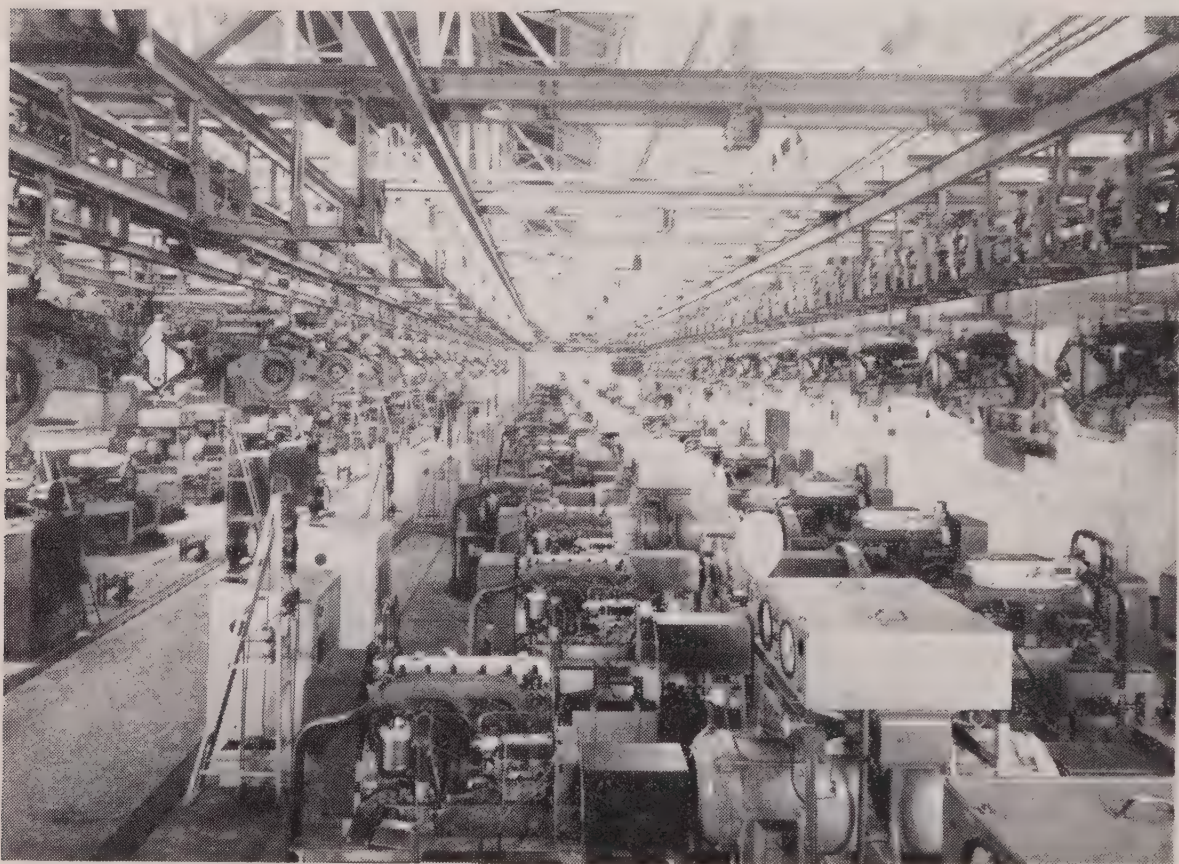
The Chairman of the Division, Councillor F. Brothwell responded to the cordial welcome extended by the Mayor and expressed thanks for the hospitality provided by the Peterborough City Council to the members on their arrival.

He then introduced Mr. C. J. Hind, Director of Group Engineering of Perkins Engines Ltd., who addressed the Division. While not attempting to underestimate the present and future contribution the internal combustion engine was making and would make to pollution, Mr. Hind exploded a commonly-held impression that the diesel engine was the principal offender. He said that this impression in the public mind stemmed from the visible smoke and smell which was sometimes the feature of diesel engines. He did not defend the emission of smoke which was completely avoidable in a properly maintained engine, but pointed out that this form of pollution might be classed as a nuisance rather than a health hazard. The emission of the invisible toxic gas carbon monoxide was an entirely different matter and Mr. Hind made a startling comparison between the petrol engine and the diesel engine in this respect. He stated that in 1967 petrol engines in Britain used 12·5 million tons of fuel while diesel engines used 4·5 million tons; and in the burning of this fuel, petrol engines discharged 5·7 million tons of carbon monoxide into the atmosphere compared with only 0·09 million tons from diesel vehicles. If all the petrol engines were replaced by diesel engines, the carbon-monoxide discharged into the atmosphere would be reduced from 5·79 million tons a year to 0·29 million tons. With these facts in mind, Mr. Hind wondered if there was not some justification for re-naming this Society the National Society for Pure Air for he felt sure that members must be more concerned that the public should be breathing a pure air rather than a visually clean air. The address provoked a good discussion and Mr. Hind dealt expertly with the many questions raised.\*



The Chairman expressed thanks to Mr. Hind for his excellent contribution to the meeting.

At the close of the morning session members were conveyed by coach to the Eastfield Factory of Messrs. Perkins Engines Ltd., where they were entertained to lunch by kind invitation of the Company. The party was received by Mr. Richard Perkins, the Deputy Group Managing Director, who in his address of welcome spoke with justifiable pride of the growth of the Company from the early 1930s until the present time when they enjoyed the distinction of being the largest manufacturers of diesel engines in the world, the production capacity in the United Kingdom alone being 1,500 units per day.



The Test Shop at Eastfield

Then followed a very extensive tour of the Eastfield Factory. Small parties were conducted along the automated assembly lines and saw various engine components fashioned and gradually come together to produce diesel engines in the 20 to 170 brake horse power range, finally viewing the completed engines undergoing their final test on the fully instrumented test beds. Walking round this vast factory members were impressed not only by the complex mechanization but also by the clean working conditions for the personnel in all sections. At the conclusion of a most interesting tour members were entertained to tea by the Company.

Mr. John Wilson, the Chief Public Health Inspector of the Chesterfield Rural District Council, proposed a vote of thanks to Mr. Richard Perkins, the Deputy



Group Managing Director and through him to Messrs. Perkins Engines Ltd., for their kind invitation to the Division, for the provision of transport and for the generous hospitality provided. He thanked Mr. J. S. James the Community Relations Manager who was largely responsible for arranging the visit, and the guides for their courtesy and patience. Finally he thanked Mr. J. Hall, the Chief Public Health Inspector for Peterborough and his Deputy, Mr. K. R. Enderby, who had been responsible for the general arrangements for the meeting in conjunction with Mr. James, and Chairman and Honorary Secretary for their contribution towards a very successful meeting.

*G. Drabble, Hon. Secretary*

\* The address given by Mr. C. J. Hind has been published as a brochure and circulated to members of the East Midlands Division. Copies may be obtained from the Society.

## South East

Following the Annual General Meeting of the South East Division at the Friends' Meeting House, Euston Road, London, N.W.1 on Thursday, 7 November, 1968, Mr. R. S. Thornton of the Ministry of Housing and Local Government and Secretary of the Clean Air Council, addressed the members on "The New Clean Air Act and Clean Air Generally".

After stating that 10 years of operation of the Clean Air Act 1956 had resulted in a considerably reduction in air pollution, Mr. Thornton went on to say that industrial smoke had decreased by 75%, in many areas there had been a dramatic reduction in domestic smoke, smoke from railway engines was no longer a problem and although the emission of sulphur dioxide had increased, the ground level concentration, which was what really mattered, had decreased. The community was ready to go beyond the 1956 Act. Experience had shown that there were weaknesses in the Act which should be remedied.

The first step was taken by Mr. Robert Edwards, M.P., who introduced a new measure under the Private Members' Bill procedure. This was limited in scope and Mr. Edwards agreed to withdraw it on the Government undertaking to support a more comprehensive Bill. In due course Mr. Robert Maxwell drew a place in the ballot for Private Members' Bills and introduced a new Clean Air Bill in the preparation of which the Ministry of Housing and Local Government had assisted and advised. As a Private Members' Bill it was essential if it were to reach the Statute Book that it should not contain any very contentious matters nor involve any appreciable increase in public expenditure. Mr. Thornton then dealt with the provisions of the new Act (which had received the Royal Assent only a fortnight previously) comparing them with the corresponding provisions of the 1956 Act where such comparison was relevant and outlining those provisions of the new Act which were completely new.

Mr. Thornton was thanked by the Chairman and members were invited to ask questions. Mr. T. Iddison of Dartford spoke on the question of expenditure and expressed the view that local authorities have not been deterred on these grounds.

Mr. Thornton replied that the Government had asked local authorities to restrict the rate of growth of their expenditure. The Ministry could not actively

discourage local authorities from reducing expenditure on smoke control if they chose to make their economies in this sphere. It was the local authority's decision but the Ministry would support continued progress.

Mr. Beagle of Hammersmith asked what action the Ministry would take in the event of a local authority being in default in a smoke control programme and having already been warned. Mr. Thornton replied that in the first place the Ministry would probably invite the local authority to discuss the matter and try to reach agreement on the submission of a programme. If a direction had been given, and the local authority refused to comply, the sanction under the Act would be to apply to the High Court for an Order of Mandamus. It was not intended to make widespread or indiscriminate use of the compulsory powers.

Mr. Holmes of Windsor spoke of the changes following the fuel situation and the new system of grants. He gave details of his Authority's new smoke control area and asked whether in an area where there is ample suitable fuel available they could go back to the old system and reduce the wide choice of expensive appliances which is now allowed. In reply, Mr. Thornton said that it had been suggested that in an area which is not an area of new houses but houses already possessing approved open grates burning gas coke, it should not be necessary to pay grant for converting it. It was difficult to give a specific answer. It was for the local authority to decide what was reasonably necessary. The Department had always taken the view that people should not have to burn the more expensive fuels in order to comply with a Smoke Control Order.

Mr. Cox of Barking stated that three-quarters of the conversions had been to gas coke and enquired the position when gas coke was no longer available. Could a second grant be paid? Mr. Thornton answered that second grants would need amending legislation. In any case the cost would be very high, and the work involved might cause further delay to the smoke control programme. The suggestion was not likely to be supported in view of alternative fuels being available, although admittedly at higher cost. The recent increases in the price of coke had lessened the difference in price.

Mr. Butler (Individual Member) drew attention to the dark smoke from fires on demolition sites in cities and said in London there was an apparent disregard of the great nuisance caused to residents and to theatreland and tourism. This was primarily a matter for the local authority according to Mr. Thornton. Dark smoke from demolition and building sites would be covered by Section 1 of the Act when it was brought into operation, unless they were exempted. The Minister has been given power to exempt certain materials and there would be consultations with various interests. It should be noted that dark smoke was mentioned and therefore combustion not producing dark smoke was not caught by this Section.

To the suggestions that attention should be concentrated on gaseous pollution and that radio-active fall-out might be increasing, Mr. Thornton replied that the question of gases, especially from motor vehicle exhausts, was raised at most meetings of the Clean Air Council and the pressure was kept up by the Council. It was receiving the attention of various Ministries. Regarding radiation fall-out, Miss Bryant of the U.K. Atomic Energy Authority and a member of the S.E. Divisional Council, confirmed that a careful study of fall-out was in progress and there was strict control of emissions from nuclear plant. A sense of proportion, with confidence in the Atomic Energy Authority and its precautions was



needed. There were strict international and national rules to control emissions and disposal of waste materials from nuclear plant.

Mr. Mahoney of Westminster referred to the provision of grit arrestment plant for new furnaces and stated that there was no mention of repealing Section 6 of the Clean Air Act 1956. Mr. Thornton explained that Section 6 was not to be repealed. It applied to a different set of furnaces, i.e. those which were "new furnaces" under the 1956 Act.

The Chairman expressed the thanks of the meeting to Mr. Thornton.

*J. S. Hodgins, Hon. Secretary*

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# LETTERS

*The Editor,  
Smokeless Air*

Sir—I have previously expressed the view in your journal that the continued considerable use of solid smokeless fuels on domestic grates in smoke control areas was undesirable because they continued to emit smoke and sulphur dioxide at low level in sufficient quantities to be harmful. If anyone doubts this he should consider the following readings (highest daily concentrations) of smoke and sulphur dioxide taken at two points in this district last winter when the area was almost completely "smoke controlled". The district is residential in character.

**Highest daily concentration of smoke and SO<sub>2</sub> (microgrammes/cu.metre) during the winter of 1967/68**

	Cheadle		Heald Green	
	<i>Smoke</i>	<i>SO<sub>2</sub></i>	<i>Smoke</i>	<i>SO<sub>2</sub></i>
October	88	119	56	109
November	657	549	509	625
December	410	367	434	422
January	387	453	349	498
February	423	641	358	629
March	229	387	163	315
April	192	272	104	246

In your Winter edition Mr. Arnold Marsh wrote that we must continue to burn solid fuel because supplies of alternative fuels would not be sufficient to meet a greatly increased demand. This might have been true if the change from solid fuel had to take place overnight but in the North West only 38% of the black areas have been made "smoke-controlled" in the 12 years since the legislation was made, and there is no sign of quicker progress. Is it seriously believed that the gas, electricity and oil industries, could not meet a greatly increased demand for their fuels in smoke control areas, spread over the next 20 years?

I have never advocated that solid smokeless fuels should be completely barred from smoke control areas. The Government are adamant that people should have freedom of choice and public opinion would be against a complete bar. However, public opinion could be influenced by propaganda on the advantages, from an air pollution point of view, of gas, electricity, or oil, as opposed to the less suitable solid fuel. Most householders (and local authorities choosing a fuel for their own houses) at present make a choice, believing that all fuels are equally clean.

There are powerful interests at national level, sometimes at local level too, which work to ensure that solid fuel retains a large part of the domestic market and a spokesman for the Government said last April that its continued use on a considerable scale was necessary for social and economic reasons. In practice there is nothing to prevent local authorities from influencing their residents' choice of fuel for the general good. If this resulted in less solid fuel being burned the authorities concerned would finish their programmes with cleaner air than would otherwise have been the case and, strangely enough, their costs would be less because the grant structure gives highest grants for solid fuel installations.

Yours etc.,

K. WILLIAMS,

Chief Public Health Insp.

*Town Hall, Cheadle.*

*The Editor,  
Smokeless Air*

Sir—In reply to the letter by Mr. W. J. Brown of Refractulation Ltd. on pages 142 and 143 of the No. 148—Winter 1968 issue of *Smokeless Air*, I entirely disagree with his opinion that the following statement in its context, in my paper presented at the Society's Congress at Harrogate in October 1968 is in any way misleading: "If there is a risk of acid condensation in a chimney, the inner wall should be made of non-porous, acid-resisting material". There are instances of chimneys, particularly with local internal pressures slightly above that of the atmosphere, that have suffered from the percolation of acid gas through the inner wall.

In relation to the statement in my paper that in certain industries the gases are at temperatures no higher than and even below the dew point, Mr. Brown says that they have had difficulty in finding any proof that there are occasions when gases enter the chimney at a temperature already below the dew point. Evidently Mr. Brown does not know, for example, the condition of the acid gases entering the chimneys at many brick works, with average temperatures in the region of 110-120°C. and variations according to the stage of the cycle of manufacturing operations in the range from 80°C. to 160°C.

Yours, etc.,

A. PARKER

*Northwood, Middx.*



# INTERNATIONAL NEWS

## EUROPE

### **Economic Commission for Europe— Work undertaken in the matter of Air Pollution**

The *Ad Hoc* Meeting of Governmental Officials on the Prevention of Air Pollution to be held 10-14 February, 1969, has as one of its objectives to establish an E.C.E. work programme on prevention of air pollution. It is wished that attention may be drawn to the following:

- (a) the Commission has been concerned with the air pollution for several years, and has adopted a number of resolutions and decisions on the subject;
- (b) some of the Commission's subsidiary bodies are already engaged in an examination and study of some of the technical problems arising;
- (c) the Secretariat has held regular consultations with the secretariats of the other international organizations concerned.

#### **E.C.E. Resolutions**

In 1963, the Commission, recalling that the question has already been raised in some of its subsidiary bodies, requested the Executive Secretary, in co-operation with the secretariats of other interested international organizations, to make a report on the possibility of preparing a study of methods for dealing with the problems of air pollution arising from various domestic, commercial and industrial sources in countries participating in the work of the Commission (Commission resolution 9 (XVIII)).

In his report, submitted in 1964 (E/ECE/514) pursuant to the above-mentioned resolution, the Executive Secretary observed that an abatement of atmospheric pollution could be achieved through various types of remedial action, including that of a legal and administrative character; he proposed that some of the work already in hand or contemplated in a number of E.C.E. committees (pollution caused by coal, thermal power stations, motor vehicles) should be intensified and that other industrial sectors which might cause atmospheric pollution (cement production, chemical industry, oil refining) should be the subject of appropriate studies. In addition, he pointed out that E.C.E. might have a role to play in:

- (a) promoting the exchange of information on the subject;
- (b) considering the economic damage caused by air pollution;
- (c) making recommendations on standard procedures;
- (d) presenting the legal and administrative aspects of the question in various countries;
- (e) recommending research.

After approving the proposals of the Executive Secretary, the Commission requested him, in 1964, to take into account the results of the Conference on Air Pollution held at Strasbourg in June of the same year by the Council of Europe, before taking steps to carry out the work programme outlined in his report (Commission resolution 7 (XIX)).

In the following year (1965), the Executive Secretary, taking into account the work of the Strasbourg Conference and the views of the secretariats of the various international organizations concerned, suggested that the various subsidiary bodies of the Commission should intensify their studies on the prevention of the emission of pollutants at the source, and that pilot studies should be undertaken on certain economic aspects of air pollution in two towns or two industrial areas to be designated (E/ECE/551).

While recommending that the Executive Secretary should take every precaution to avoid duplication of the Commission's activities in that field with those of other international organizations, the Commission approved the Executive Secretary's suggestions and recommended that he should take the necessary actions to implement them (Commission resolution 7 (XX)).

In 1966 the Executive Secretary having reported on the work of the various E.C.E. committees concerned with the question (E/ECE/596), the Commission requested him to seek the views of Member Governments concerning work which could usefully be undertaken by the Commission in this field (Commission resolution 9 (XXI)).

Pursuant to this request, the Executive Secretary presented, in a report to the Commission at its 22nd session (E/ECE/639 and Corr. 1), the proposals made by certain Governments (these proposals are reproduced in document AIR POLL/3) and suggested a work programme which might be examined at a meeting of governmental officials. The Commission approved the Executive Secretary's suggestion (Commission decision E (XXII)). [The work programme which the Commission decided to have the *ad hoc* meeting examine, as well as the suggestions made during the 22nd session of the Commission concerning this work programme, are contained in document E/ECE/AIR POLL/1 annex 2.]

### **Activities of Subsidiary Bodies**

In 1963, as part of the Coal Committee's work programme, the Subcommittee on Solid Fuel Utilization requested the Group of Experts on Coking to carry out two studies; one on air pollution by coking plants and the other on solid smokeless fuels. A great deal of work, resulting in the publication, in 1967 and 1968, of two reports, was done on these two subjects.

The study on solid smokeless fuels (ST/ECE/COAL/22) is concerned with the production of solid fuels that can be utilized without special precautions (natural fuels with a low volatile-matter content and synthetic fuels), and with the development of appliances in which available natural fuels with a higher volatile-matter content can be used, without causing pollution.

The study on air pollution by coking plants (ST/ECE/COAL/26) analyses the methods used, in a number of countries for measuring pollutants. It also describes the results obtained, indicates the danger thresholds and says what measures have been taken to reduce pollution and what the cost of such measures is at the coking plants.

The Group of Experts on Coking is at present studying the air pollution resulting from the activities of the chemical departments of coking plants. The



report submitted on this subject (COAL/U/Working Paper No. 36 and Add. 1 and 2) will be given general distribution, as were the first two reports.

The Coal Committee is continuing to study the problems of the pollution caused by the manufacture and utilization of solid fuels. It proposes, in particular, to make a detailed study of the methods used to reduce the sulphur content of coal.

### **Committee on Gas**

This Committee, too, has concerned itself with the air pollution caused by coking-plant gas, but has left it to the Coal Committee to deal with the subject. At present, natural gas is tending increasingly to replace manufactured gas. It does not cause air pollution, for its combustion can be precisely regulated, and although to start with, it contains sulphurous products it can be scrubbed and sulphur can be obtained from it, often cheaply. This operation is in any case necessary to avoid the danger of corrosion, particularly in the pipeline system.

### **Committee on Electric Power**

It is through the Working Party on Thermal Power Stations that the Committee on Electric Power has studied the problem of air pollution caused by thermal power stations. A first report, prepared by an expert from the United Kingdom and approved by the Working Party, was issued in 1963. It has been printed in a document which is entitled "Problems in the Design and Operation of Thermal Power Stations" and of which it constitutes the second volume under the title "Protection of the Atmosphere from Pollution by Ashes and Sulphurous Compounds in Smoke from Thermal Power Stations" (ST/ECE/EP/23).

The Committee on Electric Power has since decided to take up the question again, in view of the development of new smoke-cleaning techniques.

At the Bucharest Symposium in May 1968 a report by an expert from the Federal Republic of Germany dealt with "The Influence of High Stacks on the SO<sub>2</sub> Ground Level Concentration" (BUC/SYM/EP/B.16).

A study to be carried out in 1969 by an expert from Czechoslovakia on "the elimination of sulphurous products and vanadium from the flue gases of thermal power stations" will describe the smoke-cleaning techniques used at present and the results anticipated, taking into account the constraints and limitations imposed on the sulphur and vanadium of the atmosphere at ground level.

### **Committee on Housing, Building and Planning**

This Committee has included in the long-term work programme of the Sub-Committee on Urban Renewal and Planning an item entitled "Planning, legal administrative aspects of the control of air and water pollution". Pending the allocation of some degree of priority, the Secretariat has been requested to keep itself abreast of the work done on the subject at the international level.

### **Heating of large housing developments**

A Symposium held at Prague in September 1967 under the auspices of the Coal Committee, the Committee on Electric Power, the Committee on Gas and the Committee on Housing, Building and Planning, dealt with problems of the optimum economic exploitation of energy supply for the heating and air-conditioning of large housing developments. A section of the report submitted to the Symposium was devoted to the study of air pollution as a criterion affecting the choice of energy sources for heating and air-conditioning in large housing

developments. (The documents relating to this question have been issued as PRA/SYMP/D.1, 2, 5, 6, 8-12, 15-17).

### **Inland Transport Committee**

Through its Working Party on the Construction of Vehicles, the Sub-Committee on Road Transport has been studying since 1963 the problem of the air pollution caused by vehicles. In addition, a Group of Rapporteurs on Air Pollution was set up in 1966 and is examining the technical aspects of the problem.

Various problems arising from the pollution caused by petrol engines and by diesel engines have been examined. So far as petrol engines are concerned, the sources of pollution are the exhaust gases and the gases escaping from the crank-case; the exhaust gases to be considered include those from an engine at a speed suited to town traffic and those from idling engines.

In 1964, the Sub-Committee on Road Transport adopted two resolutions; the first, relating to diesel engines, recommends that they should be so constructed, adjusted, maintained and driven as not to produce opaque fumes, and that the improper use of excess of fuel devices should be illegal on all vehicles and, of course, impossible on vehicles registered after 31 December 1965; the second resolution, relating to petrol engines, recommends that Governments should require that vehicles registered from the first time should be so fitted that crank-case gases do not escape into the atmosphere (W/TRANS/SC1/238/Rev.2, recommendations (56) and (57)).

The following is a progress report on the work done on the subject in the Sub-Committee on Road Transport and its subsidiary bodies:

#### **Petrol engines: exhaust gases**

(a) A final decision has been taken on the "operating cycle for petrol engines for quantitative determination of exhaust gas composition" in standardized conditions.

(b) Upper limits for carbon monoxide and hydrocarbons are to be submitted to the Sub-Committee for approval.

(c) A draft recommendation is to be submitted to the Sub-Committee concerning the emission of carbon monoxide by idling petrol engines.

#### **Petrol engines: crank-case gases**

Two methods have been proposed to limit the emission of crank-case gases. The Rapporteurs have not yet agreed on the method to be recommended. Provision has been made for tests, which should, if all goes well, result in a recommendation on the matter in 1969.

#### **Bringing into force of the provisions**

It has been agreed that the provisions relating to pollution caused by petrol engines may be incorporated in a regulation to be annexed to the "Agreement concerning the adoption of uniform conditions of approval and reciprocal recognition of approval for motor vehicles equipment and parts", published in 1958.

#### **Diesel engines**

The Rapporteurs have studied the means of measuring the opacity of the black smoke produced by diesel engines and of checking vehicles equipped with such engines. The method of making measurements will be defined in 1969, together with the upper values to be observed.



## Steel Committee

It was in 1966 that the Steel Committee began to be concerned with the problem of air pollution caused by the iron and steel industry, for in that year it included in its work programme an item entitled "Air and water pollution arising in the iron and steel industry".

In 1968, an *Ad Hoc* Group of Experts on Air and Water Pollution began a study of the problem, to be based on information submitted by Governments in response to a Secretariat questionnaire.

## NORWAY

Air pollution is becoming a serious problem in Norway. It is caused by industrial material arising both from Norwegian sources and from the industrial centres of Britain and the Continent. The Director of the Public Health Service has called for a ban on the use of heavy fuel oils which have a high sulphur content. This suggestion has also been taken up by politicians. However, the change from heavy to light fuel oils would be expensive for industry.

## SWEDEN

All cars sold in Sweden from 1971 will have to be equipped with effective exhaust cleaners, and carburettor and ignition systems of older car models will have to be readjusted. The measures are expected to reduce the emissions of carbon monoxide and hydrocarbons from new cars by 40% and those from older models by 20%. The new rules for older cars will come into force as soon as simple and reliable methods have been developed to measure the carbon monoxide level of idling. Cars will be tested in connection with annual compulsory check-ups, backed up by spot checks by mobile inspection patrols during the year.

## WEST GERMANY

The Dust Engineering Group of the V.D.I. (Verein Deutscher Ingenieure) is organizing a conference on "Research in the Field of Dust Engineering" on 6/7 March, 1969, at Wiesbaden. Those interested, please make inquiries to the organizers: V.D.I., Abt. Organization, 4 Dusseldorf 1, Graf-Recke-Str. 84, Postfach 1139.

## U.S.A.

### Detroit on Trial

On 10 January the U.S. Government's Justice Department filed an anti-trust suit in Los Angeles Federal District Court against America's four motor manufacturers, General Motors, Ford, Chrysler and American Motors, as well as the Automobile Manufacturers' Association. They are charged with a 15-year conspiracy not to compete in developing anti-pollution devices and with having deliberately lied to the California authorities in 1963 by saying that they would not be able to develop effective anti-pollution devices by 1966, when California's pioneering controls came into force. The suit is a civil one so all the Justice Department can hope to do is to get the court to order the companies to "cease and desist" from their co-operative efforts in the field of auto emission controls.

# REVIEWS

## **An American Study of the 1952 Smog**

**Killer Smog by William Wise**

*Published by Rand McNally, U.S.A., 183 pages, \$5.95*

Subtitled "The World's Worst Air Pollution Disaster", this book is about the London smog of 1952. It is remarkable—and it may be noted with some interest by future students of our time—that the fullest and most descriptive immediate account account of this disaster should have been published in the *New Yorker* and that this, the only full-length book about it should have been written by a New York author and published for an American readership. Apart from one or two papers and a Ministry of Health report on the episode, virtually nothing has been written and published in the country where it happened.

It is mildly intriguing to speculate why the Americans should be interested and we should apparently be so indifferent to what was our own affair. British reticence? A wish to sweep it all under the carpet and forget about it? Or just a belief that if the full story of the fog was written in book form no one would wish to publish it and very few to read it?

And how could one make a whole book about it, and especially one that would appeal to a wide public? To reflect on this basic question soon shows that it could be far from easy, and the first thing to say about *Killer Smog* is how admirably the author has adopted and has carried through what is perhaps the only effective means, especially for the American public for whom he was principally writing.

Mr. Wise devotes the first part of his book to giving a very readable account of the history and growth of air pollution in Britain, and in London especially, and then goes on in the second part to describe the 1952 in graphic detail. In addition to the general, important facts he uses personal stories, or individual case histories, showing stage by stage what happened to actual persons, sometimes tragically, during the four days. In these accounts, it is explained, names and locations have been altered, and that "for the sake of clarity and conciseness, a limited amount of material has been elided, and one person's fragmentary recollection becomes part of someone else's broader and more meaningful experience".

This technique is open to a exaggeration or even to fictional romancing, but—to a reviewer long accustomed to vetting air pollution stories—Mr. Wise's panoramic survey of the smog and its effects has the ring of authenticity, even when, as a result of his own investigations, he is relating something novel and unexpected. Similarly, the preceding historical account is notable for its accuracy and balance. The essential homework was well and patiently done.

These references to Mr. Wise's investigations are not surmise. He spent some weeks here in London making a very thorough inquiry into the whole subject, reading, and meeting and questioning officials, medical men, and the people who had a smog story to relate. And, like all good investigators should, he came



to the Society for assistance and suggestions, and for literature, which the present writer and the Information Officer, Mrs. Finlay, were happy to give him.

The book says some appreciative things about the Society, and especially gratifying is his tribute to, and recognition of the value of, the report of the smog published in the Spring, 1953, issue of *Smokeless Air* and subsequently reprinted and widely distributed as a separate pamphlet.

There are some critical words about our attitude to the danger from the smog:

"The full toll of human life exacted by London's worst air pollution disaster was never determined. Results of a belated statistical investigation conducted for the government by the Ministry of Health, indicated that nearly one out of every 2,000 people in the city either perished during the four-day smog or else succumbed during the following two weeks.

"These, however, were not the only victims. In addition, thousands of Londoners became seriously ill, recovered temporarily, and then died, months or even years later. To what extent their lives had been shortened by the destructive effects of the smog, no governmental or private organization could afterwards say, and indeed, no particular effort was ever made to examine the matter.

"An official study of the killer smog, published more than a year after the event, disclosed considerably information about the nature and dimensions of the tragedy; it also left a number of important questions unanswered. Curiously, the most searching question of all was never even said: why, in the light of prior knowledge and despite both old and recent warnings, had no one in a position of influence or authority made a serious attempt to forestall the disaster?"

We think we could give an answer to this question, but it would be a very lengthy one.

The third part of the book is on the aftermath of the smog, and it is a most useful survey of the events that followed—the reluctance of the government for a long time to do anything; the "gadfly" persistence of Norman Dodds, M.P., and Tom Driberg, M.P., in pressing for an inquiry; and the eventual decision to appoint a committee. The great part played by the chairman of the committee, Sir Hugh Beaver, is recognized, as is the part played by (now Sir) Gerald Nabarro, M.P. (and the N.S.C.A.), in ensuring the introduction and passage of the Clean Air Act 1956.

One of Mr. Wise's purposes in writing the book has clearly been to awaken his own countrymen to the danger of air pollution catastrophes facing them. The book ends with the words: "The citizens of London did not believe themselves to be in danger, on the fifth of December 1952. In 100 calamitous hours, the great killer smog proved they were wrong. From every appearance, a similar tragedy is now being prepared in America—and there is very little time left in which to prevent it".

It is a pity that no English publisher has felt it possible, we understand, to issue an edition of the book for the interest and benefit of readers in this country—although they can of course order copies from the U.S.A. The work should certainly be in every public and reference library in Britain that has any pretensions to an adequate section on British social and health questions. One can imagine, 100 or 200 years from now, some historian being grateful to William Wise, the New Yorker who studied and wrote up our air pollution disaster for us.

Arnold Marsh

## Emissions from Cold Blast Cupolas at Iron Foundries

*H.M.S.O. 2s. 6d. net.*

This new memorandum, based on advice given by a working party set up by Warren Spring Laboratory, has been issued by the Ministry of Housing and Local Government to help both local authorities and the industry to ensure that emissions from cupolas are minimized so far as practicable, in accordance with the Clean Air Acts of 1956 and 1968.

The structure, role and operation of the average cupola is described and an explanation given of the prefix "cold blast" (derived from the fact that unheated air is forced through the charge by a fan). Emissions are described and their relation to amenity and the preservation of health are stressed. Smoke is attributed to the use of unsuitable materials for lighting the cupola and the use of dirty scrap. Proper control of the charging cycle with a flame in the cupola shaft above the level of the charge will reduce smoke to an acceptable level. The flame will also burn off any combustible gas before emission to the atmosphere.

The memorandum concedes that little information exists regarding the emission of grit and dust or its particle size, though these can amount to 10 to 15 lbs. per ton of metal melted. A simple wet arrester is recommended to eliminate nuisance (British Cast Iron Research Association, F. M. Shaw, 49 A187) though a dry arrester should be permitted for use where less than three tons per hour is being melted.

Gases and smells are largely a chimney height problem; stacks should never be less than 65 feet and designed to produce as high an efflux velocity as possible. The memorandum contains a detailed appendix on the determination of chimney height.

Metallurgical fume, a long-standing and largely unresolved problem, particularly in iron refining pigging units is examined and although experience is being gained with electrical precipitators, venturi scrubbers and bag filters it would be premature to suggest that the complete answer has been found. Dispersal to the atmosphere is, by implication, condoned in circumstances where arrestment is shown to be impracticable, but a chimney height of not less than 120 feet above ground level is required.

The role of the Alkali Inspectorate and the National Industrial Fuel Efficiency Service in giving advice is described, and foundries can also approach the British Cast Iron Research Association for advice on fume dispersal. The memorandum concludes with an examination of problems encountered during the blow down period.

## Strategy II The North West of the 1970s

*Report of the North West Economic Planning Council. H.M.S.O. 10s. 6d. net.*

This Report marks a stage in a continuing process of working out a planning strategy for the economic and physical development of the North West Region, and adapting it to changing circumstances. Among the 30 conclusions which are stated in the Report, No. 11 reads: "the declaration of smoke control areas should be mandatory upon at least all urban authorities in the region, and a greater attack should be mounted on other forms of pollution". The Report states that



the heavily industrialized central belt of the North West Region suffers from severe atmospheric pollution. Although conditions are improving, the rate of progress is slow, and running well behind schedule. As a result, people are less healthy than they should be, and need to spend more time on cleaning and maintenance than elsewhere in the United Kingdom. In the south east of the region present-day atmospheric pollution produces a coating of grime on trees and other plant life. On the other hand, atmospheric pollution has little effect north and west of the line from Liverpool through Blackburn to Skipton. But "atmospheric pollution adversely affects practically every aspect of the economy of the region. Its removal would simplify and cheapen the cost of many of the other improvements . . . and be one of the quickest and cheapest ways of improving the region's economy and attractions". Finally, the Report urges that the regulations covering pollution by vehicle exhausts, particularly heavy goods vehicles, be more strictly enforced.

### **Annual Report of the Scientific Adviser to the Greater London Council 1967**

This very comprehensive Report is in six main parts: water pollution and sewage treatment; building materials for construction and maintenance; environmental studies; statutory; general supplies and services; and general. Part 3, environmental studies, is the part which interests us as included in this is a section on air pollution. The Report points out that regular though limited measurements of the degree of air pollution in London were started as long ago as 1920. These measurements have been continued without a break apart from the War years, as a contribution to the long-term investigation co-ordinated by the Warren Spring Laboratory. They constitute a useful record of the subsequent improvement of the air of London. The results obtained by means of volumetric instruments at seven representative sites in inner London indicated a continuing reduction in the average concentrations of the two major pollutants of concern, smoke and sulphur dioxide. The average measured concentration of smoke during 1967 was 55 microgrammes per cubic metre. The figure for the preceding year was 65. The estimated figure for the two years preceding the Clean Air Act of 1956 was between 190 and 200. For sulphur dioxide, the 1967 figure was 161 microgrammes per cubic metre, compared with 175 for the year 1966.

During 1967 the highest single daily averages recorded were 400 microgrammes of smoke and 1,030 microgrammes of sulphur dioxide, per cubic metre of air. These occurred during the late Autumn and were similar to those in 1966.

Instruments have been maintained for many years on the roof of St. Paul's Cathedral, the stonework of which has suffered much in the past from the corrosive effects of polluted air. The Report continues that "the downward trend of air pollution in London should ensure that the improved appearance of the Cathedral and other buildings and monuments brought about by recent cleaning and renovation will be long lasting".

A two-day recording of the concentrations of carbon monoxide and smoke from motor vehicles was made in a formerly quiet and rather narrow residential street, following the diversion of main road traffic through it by a temporary one-way scheme. Although unpleasantly high levels of these two pollutants were recorded during busy periods, these were not sufficient to show that the condition of the air could be described as harmful. The Report expresses the opinion that the disturbance of the air by free-moving traffic helps to disperse fumes in an open street.

## **Warren Spring Laboratory, Report for 1967**

*72 pages. H.M.S.O. 9s. 6d. net.*

The Laboratory's Steering Committee says, in its section of the Report, that six firms have derived new annual turnover of over £1 million from the expenditure of about £15,000 on sponsored research at the Laboratory. This is an example of the value to industry of the work of the Mineral Science and Technology Group, which earned some £64,000 on contract work in the year under review.

The value of the Laboratory's expertise in the field of computer control of chemical and process plant has been underlined by industrial support for the Laboratory's special one-week appreciation courses for teams from industrial firms; 12 of these courses were held during the year.

But it is the section on air pollution which is of main interest to us. The Report states that as in previous years, a large proportion of the effort in this field has been devoted to the National Survey of smoke and sulphur dioxide. Investigation has also continued into the dispersion of chimney gases, and new work has been started on the drift of pollution from towns, on the measurement of carbon monoxide concentrations in streets and on pollution from brickworks. So far as the National Survey is concerned, production has now begun on an additional set of data summary tables. These tables will appear annually and will give the average smoke and sulphur dioxide levels over the four-day period, Tuesday to Friday, of each week. These statistics should provide a realistic picture of pollution levels during the working week.

The results of a roadside survey of the concentration of carbon monoxide in a number of towns, indicate that the importance of carbon monoxide as a pollutant may have been over-emphasized. However, the Report goes on to say that further measurements which are now being taken will be needed to confirm this finding.

As regards pollution from brickworks, the Report states that pollution by fluorine compounds in the vicinity of brickworks has always caused some concern, but pollution by sulphur is now receiving more attention.

The Laboratory has now purchased a laser radar, known as a Lidar, to study the vertical mixing of pollutants in the atmosphere since it has been found that smog occurs when meteorological conditions restrict this vertical mixing.

## **Research into Environmental Pollution**

*Report of Five W.H.O. Scientific Groups, 1968. H.M.S.O. 8s. net.*

The public health consequences of environmental pollution are of growing concern to the governments of the world. As this Report points out: "Pollution seems to be an inevitable consequence of modern industrial technology, rapid and convenient transport, and comfortable housing, but excessive pollution may interfere with man's health and his mental, social and economic well-being. The problem, then, is to determine the level of pollution that permits optimum economic and social development without presenting hazards to health".

Between March 1963 and November 1965 five Scientific Groups were convened by WHO to review existing knowledge of the biological and other aspects of environmental pollution and to provide guidance as the further research needed.



This consolidated Report of the five Groups summarizes their principal findings. It points out that "Regulations designed for public health protection are sometimes based on the assumption that there is only one route of exposure for the substance in question. Such an assumption is generally false and it is becoming increasingly obvious that pollution exposures from all sources should be evaluated together". Attention is also drawn to the importance of pollution by the newer synthetic organic chemicals, many of which enter directly or indirectly into food, while others find their way into drinking water or the atmosphere.

After a general survey of the basic principles of evaluation of environmental pollution, and of some recent trends, the Report considers in turn the special problems of air pollution, water pollution and soil pollution.

The largest of these sections is devoted to air pollution: particular attention is paid to sampling and measurement, analytical methods and to the choice of instruments. The danger to man from certain air pollutants is fully discussed, and there is a brief statement about control and prevention of pollution.

The last part of the Report reviews research problems and makes specific recommendations on the further research required.

### **Code of Practice for Small Bore Central Heating Installations**

*CP. 3006 Part 1, B.S.I. Sales Branch, 101/113 Pentonville Road, London, N.1.  
10s. net*

In the 12 years or so since the introduction of small-bore central heating, installers have been able to obtain guidance from a number of publications by independent authors, by fuel authorities and by manufacturing concerns. Now, the pooled opinions of representatives from over 20 national bodies on good practice in this field are available in a new British Standard Code of Practice, *CP 3006 Central heating for domestic premises Part 1: 1969 Low pressure forced circulation hot water (small bore) systems*.

Part 1 of CP 3006 defines its scope as the general planning, designing and installation of forced circulation systems of 25,000 Btu/h to 150,000 Btu/h (7.5kW to 44kW) capacity. It does not apply to back boiler systems, systems providing hot water only or pressurized heating systems. Metric conversions are given in International System (SI) units and are approximate, the code being on the agenda for revision in metric terms as part of BSI's metrication programme.

The opening section of the code should help to clear the air on the subject of terms associated with the purposes of central heating. It provides definitions of "central heating", "whole house central heating", "part house central heating", "background central heating" and "packaged deal heating". Design information that must be considered and settled by the designer at the planning stage to ensure good and economical design for the system selected is given in detail.

Materials, appliances and components are specified in the second section which covers existing British Standards, boilers, thermometers, flues, stoking and cleaning tools, circulating pumps, pipes and pipe fittings, valves, radiators and heating elements, thermal insulation, boiler temperature controls, expansion cisterns and indirect cylinders.

Design considerations given in the third section include a clause on the general aspects of design, which includes a table giving room air temperature and rates of air change on which heat-loss calculations should be based. There follow detailed requirements for rating of boilers, installation of chimney and flue pipe,

pipe sizing, circulation pressure, arrangement of feed and expansion cistern, cold feed pipe, vent pipes and venting, the selection and location of radiators or heating elements, installation of valves, thermal insulation, indirect cylinder and system control, provision of draining taps, and attention to fuel delivery and storage facilities.

The fourth section deals with installation work on site. A few of the items covered are the structural considerations of boiler installation, good practice in fitting flues, pipework, radiators, and connections to the pump and to indirect cylinders.

Testing of the boiler and the installation in general is described in a final section relating to commissioning. This also specifies conditions of handling over the installation and the offering of a maintenance agreement.

Copies of CP 3006 Part 1 may be obtained from the B.S.I. Sales Branch at 101/113 Pentonville Road, London, N.1. Price 10s. each (postage 9d. extra to non-subscribers).

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### **Conference on "District Heating for the New Britain" 22 April, 1969**

A one-day Conference on "District Heating for the New Britain" is being organised by the Department of Architecture and Civic Planning at the University of Nottingham on Tuesday, 22 April, 1969. The Conference will be timed to allow easy connection with London trains.

The theme of the Conference is the role of District Heating in architectural design and its implications for urban planning. It is aimed at bringing together architects, planners and engineers to assess progress in district heating and discuss its future development. Papers will be presented by leading architects and heating engineers on subjects like "The Implications of District Heating in Architecture and Planning", "District Heating from Refuse Incineration", "The Economics of District Heating" and "The Heat Distribution System".

The registration fee, which will include copies of the papers, morning coffee, lunch and tea will be £2 2s. 0d., and should be made payable to the University of Nottingham and sent to the Conference Secretary, Building Science Laboratories, Department of Architecture and Civic Planning, University of Nottingham, University Park, Nottingham, NG7 2RD.

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### **Clean Air Act (Northern Ireland) 1964**

Regulations, dated 28 January, 1969, made by the Ministry of Health and Social Services under Section 23 (1) of the Clean Air Act (Northern Ireland) 1964 came into force on 1 March, 1969.

They state that in any new building in certain areas specified in the schedule of places which includes Belfast, Londonderry, nine Boroughs, 13 Urban Districts and 13 Rural Districts, no appliances for heating or cooking may be fitted unless the appliance is designed to burn as fuel either gas, hard coke or anthracite.



# INDUSTRIAL and COMMERCIAL NEWS

## HEATING

### **Associated Heat Services Limited. Penicuik District Heating Scheme**

A recent district heating scheme to be given the go-ahead is for a local authority development of 400 houses at Penicuik, Midlothian in Scotland. A contract for the work was signed between Midlothian County Council and the National Coal Board at a ceremony in Edinburgh on Tuesday, 26 November, 1968.

In addition to the residential development which covers a site of 26 acres, consideration is being given to linking two schools and a small industrial estate which will adjoin the development, to the system. There are also plans to increase the number of houses by a further 200.

The central boilerhouse has been designed to blend harmoniously with the estate and will contain three Centrax boilers each rated at 5 million Btu/hr. Completely free from smoke emission, the central plant will consume 1,500 tons of washed singles from Bilston Glen Colliery, only four miles from Penicuik, each year. Fuel will be delivered by tipper vehicle into a 40-ton capacity bunker from which it is fed to each of the three boilers by Bigwood bunker to boiler underfeed stokers.

Hot water at 45 p.s.i. pressure and a temperature of 200°F will be distributed throughout the development by means of buried mains to each individual dwelling. Heating within the dwellings is by warm-air heat exchanger; based on Parker Morris standards, the system is designed to provide 65°F in living areas and 55°F in bedrooms. Domestic hot water will be provided from a 30-gallon cylinder at temperatures of 140/150°F. Heat consumption will be metered by a watt/hr meter attached to the fan of the heat exchanger; domestic hot water by flow meter installed in the cold water feed. Heating and hot water will be available throughout the year, as required.

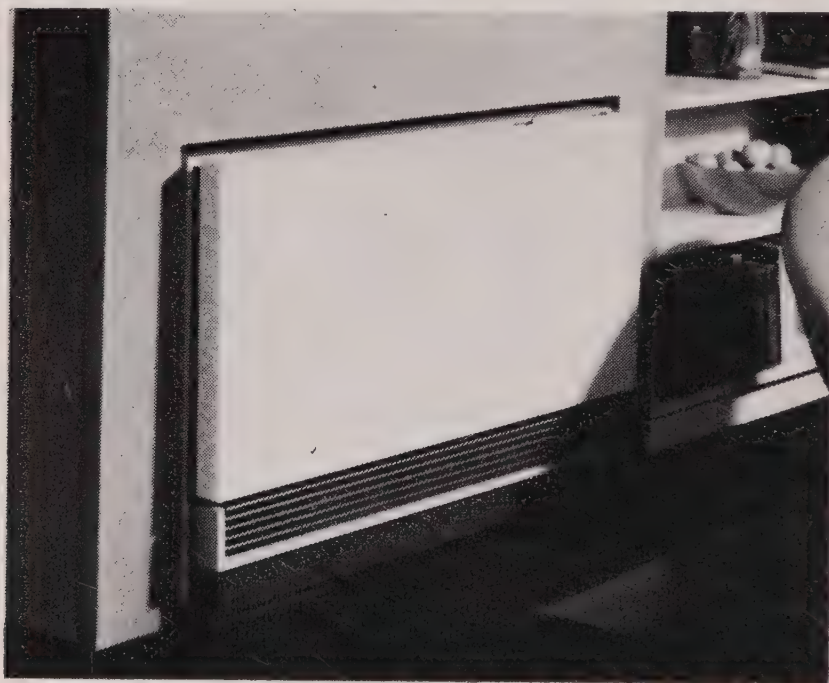
The system was designed by Associated Heat Services Ltd., who will operate the scheme on behalf of the National Coal Board. The Company will have full responsibility for the Station including management, labour, maintenance and the provision of fuel. In addition the Company will, in conjunction with Midlothian County Council, provide tenants with an advisory service on how to obtain the most efficient service from the system at minimum cost. The Company's resident boiler/maintenance staff will also be available to maintain internal equipment and answer day-to-day queries as they arise.

### **Cheaper Electric Home Heating**

The Electricity Council's Electric Domestic Appliances Exhibition held this year in Harrogate from 3 to 6 February, presented the visitor as usual with an impressive and huge array of the most up-to-date electrical equipment for the home. From the point of view of clean air, the technical and economic improvements in the field of electric central heating were naturally of greatest interest.

The most significant news here is that the modern high capacity storage heaters now require a night charge of eight hours only, without the additional afternoon boost as at present. This means that the users of such heaters will be able to use the very cheapest off-peak tariff, which is around 60% less than the ordinary domestic rate.

As a result of this new eight-hour equipment, the Electricity Council believe that the day/night tariff (already available in some Area Boards) will be of greater interest and advantage to their customers. The centre-piece of the new system will be a White Meter, which, available from April, will enable consumers to have ALL their domestic electricity at two different rates—a day rate and a much cheaper night rate, usually available from 11 p.m. to 7 a.m.



Parkinson Cowan Constor CS45 Slim-Line Storage Fan Heater used a multi-room heater

Mr. P. A. Lingard (Member of the Electricity Council), addressing his audience at the Press Luncheon in Harrogate, said that the White Meter would appeal particularly to customers who installed the new eight-hour storage radiators, or Electricaire units, and who also used electricity for water heating. Their needs would be mainly met by charging their equipment at the cheap night rate, while any additional electricity they needed would be charged at the day rate.

The White Meter used for this tariff would be the only meter required and there would be a time switch. The meter would have two registers, one recording all the electricity used during the day, the other recording night use. The quarterly standing charge for the tariff would be higher than that applying to existing unrestricted tariffs. Mr. Lingard was unable to give any precise details of charges under the new tariff, but it was likely that the night rates would be close to the existing rates for the eight-hour restricted tariffs, and the day rate would be either the same or a little higher than the existing unrestricted domestic tariff.





Parkinson Cowan Constor CS3C Storage Fan Heater

Looking round the exhibition, one could see that apart from the reduction in running costs through technical improvements, the new storage heaters, radiators and fan heaters, had been designed to take up very little floor space. The new Electricaire heaters (central heating by ducted warm air) have been improved by slim design, automatic control and better performance. Some heaters (see photo) can be built into a wall to provide warmth in two rooms.

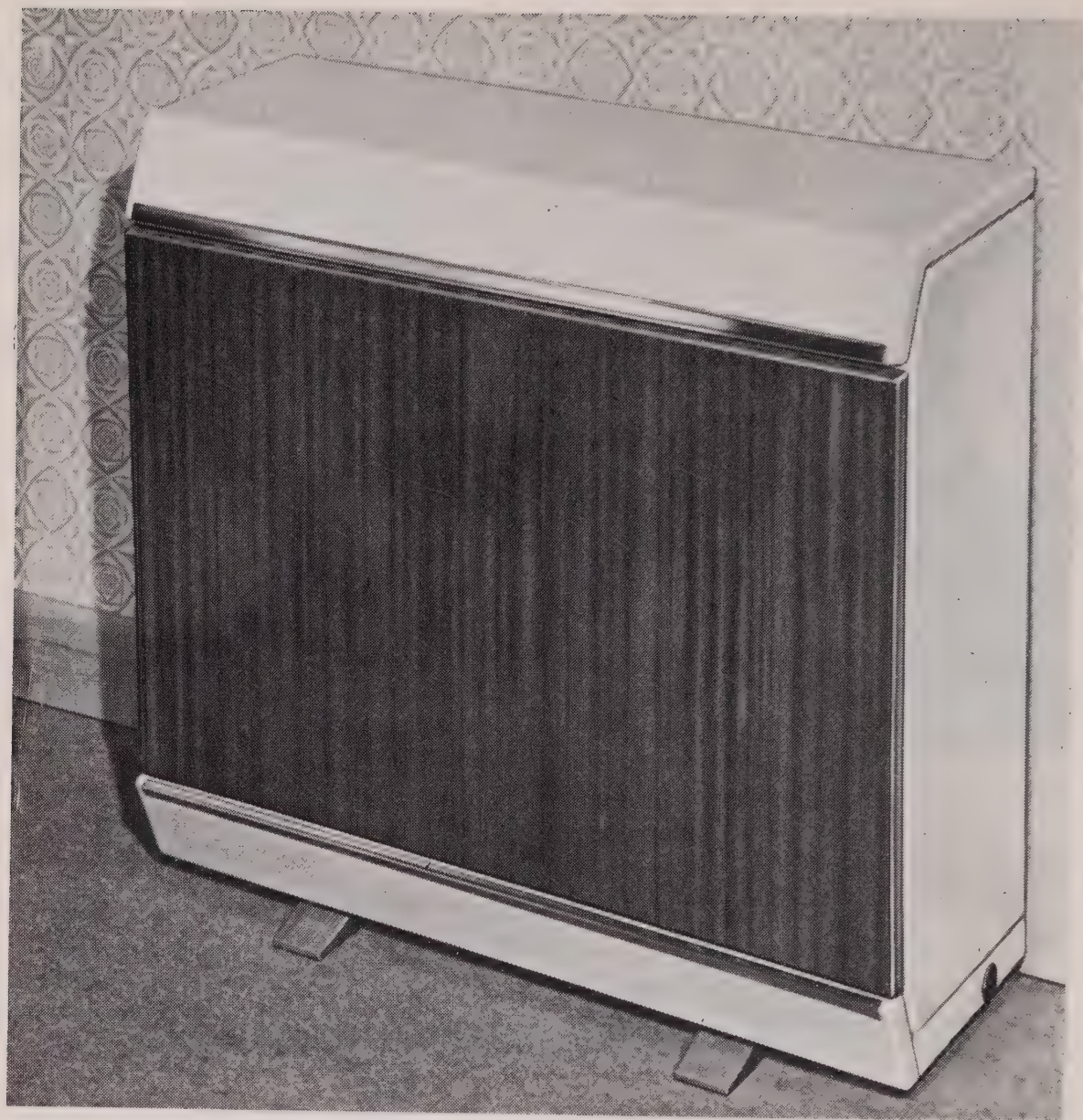
## **The Straight Eight—Heatstore's New Eight Hour Storage Radiator**

Heatstore Limited announce the launch of their new range of Electric Storage Radiators which will work on an eight-hour night charge only. The Straight Eight, another development in the forefront of Electric Storage Radiator design from the Wigan company, is a successor to the highly successful Heatstore HR radiators.

An entirely new internal construction using a very high-density refractory medium and slab-formed mineral wool insulation enables these new radiators to provide 24 hours comfort conditions using the cheapest available eight-hour off-peak tariffs. The new Heatstore 'Straight Eight' radiators are extremely compact, with a total depth of  $11\frac{1}{2}$  inches including back spacers, and the range comprises three models 1.8 kW, 2.5 kW and 3.5 kW the dimensions, are as follows:

1.8 kW— $26\frac{1}{2}$ " long,  $22\frac{1}{2}$ " high  
 2.5 kW— $26\frac{1}{2}$ " long,  $25\frac{1}{2}$ " high  
 3.5 kW— $38\frac{1}{2}$ " long,  $22\frac{1}{2}$ " high





Heatstore Straight Eight Storage Radiator HRX 2

The variable input control, located centrally on the back of each radiator above the back spacer, allows for the selection of a wide range of temperatures. When set at minimum the radiators can provide "de-frost" conditions when premises are to be left unoccupied for the extended periods during cold winter weather.

These radiators will also work safely on an off-peak tariff giving an eight-hour night availability plus a three-hour mid-day boost, should this be required.

## **BOILERS**

### **New Soot Remover Saves Boiler Maintenance Costs**

New Formula Forfol Soot and Deposit Remover should be of interest to those responsible for boiler maintenance. It is common knowledge that the ever-increasing efficiency of modern boiler plant has been, in no small measure, due



to the higher and higher loadings placed on each square foot of heat transfer surface. The consequent need to maintain heat transfer efficiency by keeping such surfaces free from deposit now is of paramount importance. This knowledge of cleanliness is universally accepted as an ideal, but the simultaneous rise in labour costs and the increasing reluctance of staff to undertake the arduous and unpleasant task of boiler cleaning have meant that this very important facet of good boiler practice poses considerable problems.

As a result of this development, a great deal of work has been carried out in studying the effects of treatment using sophisticated chemical compounds to inhibit the build-up of deposit or reduce it to an easily manageable state.

The New Formula Forfol Soot and Deposit Remover produced by Forfol Ltd. of Barnet, Herts. is designed for foolproof use and the premeasured dosages are simply introduced into the combustion zone of the boiler at working temperature. Thus the treatment may be carried out without the need for taking a boiler out of line—a boon to those under pressure from their works for maximum boiler availability on a continuous basis.

In the best case the combustible elements of the deposit are burnt away by reaction with New Formula Forfol and no manual attention is needed; in all cases the characteristic tenacity of the hard deposit is reduced and cleaning may be effected by use of a stiff brush with or without ancillary vacuum equipment.

This new product is suitable for use with liquid or solid fuels, is non-toxic and non-hazardous, and may be used to considerable advantage on all types of boilers, pre-heaters and economizers—indeed, wherever heat transfer surfaces need to be cleaned and are at a sufficiently elevated temperature to permit the chemical reaction to take place.

## **What Price a Thermal Storage Boiler?**

The Metropolitan Engineering Co. Ltd. of London S.E.1. believe that many of the advantages of installing a gas-tight sealing unit at the exit of a boiler are well known. Flue gas temperatures and velocities will be maintained, smut emission and corrosion prevented, and thermal shock to the boiler will be minimized. But there is another advantage, however, which is frequently overlooked—a straight cash saving. When gas-tight sealing units close to isolate the boiler from the chimney pull, the boiler itself becomes a thermal storage unit. The fuel saving is substantial and is effected when the efficiency of a plant normally falls to its lowest, i.e. when a hot boiler discharges heat uselessly to atmosphere.

The effects of gastight sealing of the exit of a boiler are at once apparent with a steam raising plant. Where normally a 40 lb. pressure drop takes place after an overnight shut-down, with gas-tight sealing a full head of steam will be available the following morning.

After a complete weekend shut-down an economic boiler may be practically cold if no reflashing or banking has taken place. However, a gas-tight seal isolating the boiler exit will keep it hot, under pressure and ready for a very quick start when required, without the use of any flashing oil or banking coal. In terms of fuel saving, assuming a burning rate of 20-30 gals/hr, anything between £3 and £8 per week can be saved.

The potential fuel savings are not normally so apparent with smaller boilers, say down to half a million B.T.U.s, because of the small heat storage capacity

of such boilers. Consider, however, the operation of a small boiler like this during spring and autumn in a school or block of flats where there are many windows. The day starts crisp and cold and the boiler is firing continuously at a high and efficient rate. The gas-tight sealing unit fitted at this boiler's outlet may be used for draught control purposes but it will seldom close.

At 10 a.m. the sun gains strength, the thermostat begins to cut out and the burners follow suit. From then until 3 or 4 p.m. the burners will be cutting in and out or turning down to low flame, which is just as bad, continuously. The burner cuts out just when the boiler is at its very hottest.

Unless gas-tight sealing units are fitted the biggest radiator in the entire building will be the boiler itself, discharging heat uselessly to atmosphere.

If, on each occasion when the burner cuts out, gas-tight sealing units close to "seal in" the heat that has been paid for, and to enable it to be used for its proper purpose, that small boiler is used as a thermal storage vessel. The fuel saving alone will usually pay for the cost of the installation of the sealing unit.

## **AIR POLLUTION CONTROL EQUIPMENT**

### **Major Breakthrough in Elimination of Offensive Smells**

It is claimed that the age-old problem of dealing with objectionable smells released during the extraction of meat and fish by-products has been effectively and permanently solved by the Decatox industrial clean air (through catalytic after-burning) system.

Decatox, manufactured by Schilde Aktiengesellschaft of Hersfeld, West Germany, not only rids industrial flue gases of poisonous substances and obnoxious odours but also gives a bonus in that the heat generated by the catalytic after-burning process can be used for additional process heating and drying or to replace conventional forms of factory heating.

In one installation, at a Continental chemical works, the heat energy is used to produce large quantities of steam, the generation of which has resulted in such an extensive reduction of running costs that the Decatox plant will have paid for itself within two years.

The first Decatox plant in Britain has now been installed at Smithfield Animal Products Trading Co. Ltd. (a member of the Smithfield & Zwanenberg Group) Court Farm, Bedfont Road, Stanwell, Middlesex. This company manufactures tallows, greases and animal foods.

Situated adjacent to London Airport, with residential property nearby, the Smithfield factory had unsuccessfully tried all the previously-known methods of odour elimination and continually suffered complaints from the local residents' association.

The Decatox plant is expected to create wide interest from food science and technology experts, those connected with agriculture and fisheries, meat, fish and poultry by-products industries, public health authorities, the Ministry of Housing and Local Government and the Alkali Inspectorate.

### **Removal of Sulphur Dioxide from Flue Gases**

After more than a year of testing the prototype plant at the St. Louis and Metropolitan Edison Co.'s power station at Reading, Pa, U.S.A., Monsanto Chemicals Ltd., are now ready to design and sell on a commercial basis their



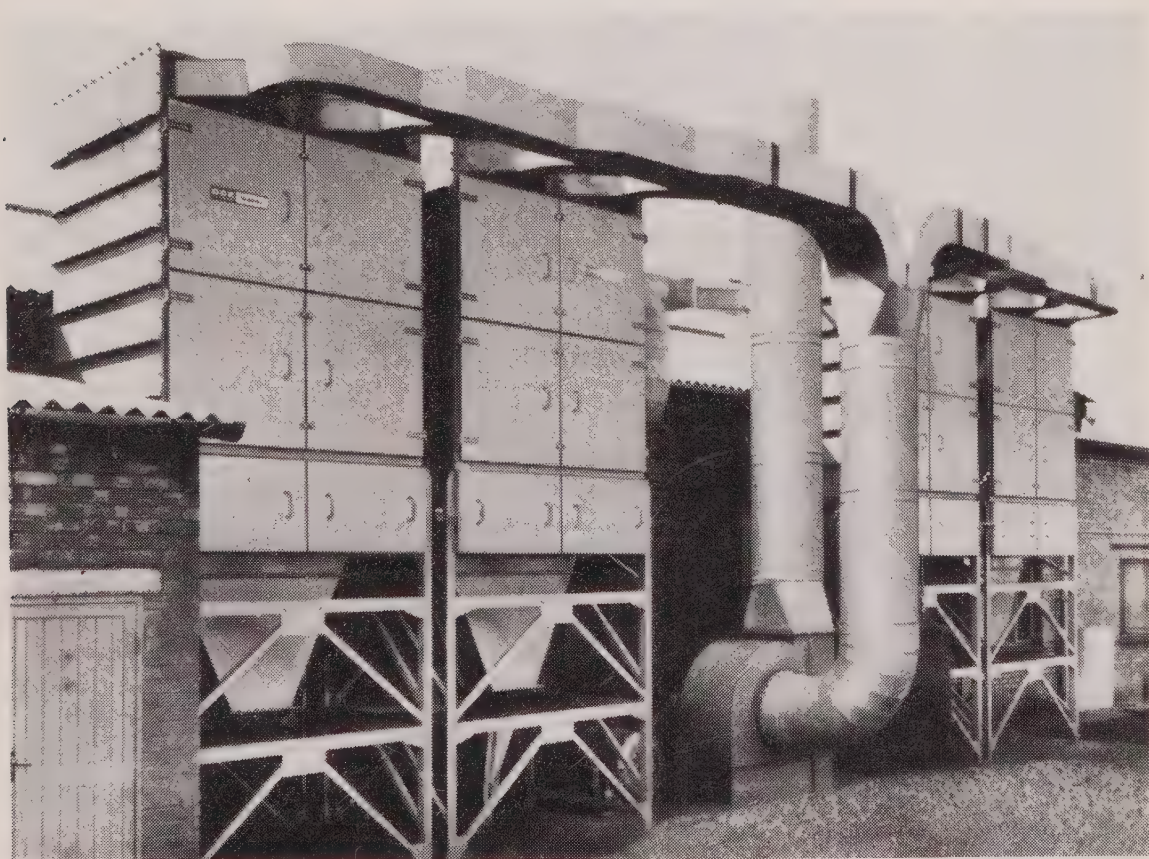
Cat-Ox process for the removal of sulphur dioxide and fly-ash from the flue gases of coal fired plant.

The Cat-Ox process is one of catalytic oxidation. Flue gases at 900°F are taken directly from the boiler and passed through a hot electrostatic precipitator to remove the fly-ash. It is claimed that up to 99.5% of solid matter is removed in this way. The flue gases then pass through a converter where, by catalytic process, the sulphur dioxide is oxidized to sulphur trioxide. The bases are then passed through a series of heat exchangers to recover heat.

The SO<sub>3</sub> and water vapour present in the gases combine in the heat exchangers, but the temperature is maintained above the dew point of sulphuric acid. The sulphuric acid is collected and removed after condensation in an absorbing tower. The acid which is formed as mist is removed from the system by a Monsanto Brink Mist Eliminator.

## **Fine, Penetrating Dust Problem Solved**

The dust produced during the manufacture of carbon and graphite parts is very fine and penetrating, requiring the use of sophisticated dust control equipment if dust dispersion is to be effectively controlled and collected. Nobrac Carbon Ltd., of Sussex, manufacturers of carbon/graphite brushes and other components for the electrical industry, has satisfactorily overcome this production dust problem by installing Dalmatic automatic dust filters designed and manufactured by Dust Control Equipment Limited, of Thurmaston, Leicester.



DCE Dalmatic Automatic Dust Filters on carbon processing at Norbrac Carbon Ltd

The basic plant requirements laid down by the installing contractors, the British Fan & Electric Co. Ltd. of High Wycombe, were: first, the ability to

operate continuously over long periods without interruptions for filter cleaning purposes, and secondly, the dust filter plant installed had to have a high operating capacity, in the order of 15,000 c.f.m., yet be of compact dimensions to meet the restricted siting area available. DCE Dalamatic dust filters were well capable of meeting these requirements, being fully automatic and employing the 'reverse-air' method of cleaning, thus enabling the filter to operate continuously over long periods and at a uniform air entrainment rate. The limitations imposed by the restricted siting area, the geometry of which was long and narrow, presented no serious problems as the basic design of the Dalamatic filter stems from a compact, multi-element filter cell made up of flat, pad-type elements, which provide a large filtering area with minimum space requirements. Furthermore, construction on the modular principle allowed each of these compact filtering cells to be built up in tiers and banks to accommodate an almost infinite range of capacity requirements.

Maintenance and replacement of worn parts is minimal as there are no moving parts, the cleaning system being operated entirely by electro-pneumatic solenoid valves controlling the reverse air cleaning action. The cycle of cleaning operations to each of the elements in turn is programmed by a solid state electronic controller located within the filter case.

### **Service for Clean Air**

Ronald Trist Controls Ltd. of Bath Road, Slough, Bucks., manufacturers of Electricon Smoke Monitor Equipment and Mobrey Boiler Controls, now employ over 80 service engineers, ready at short notice to install or maintain these important adjuncts to clean air progress. The service inspection scheme operated by the company ensures calls at intervals previously agreed with the customer, to dismantle and inspect the equipment and replace any parts which show signs of wear or which in the opinion of the service engineer might not give reliable service until the next scheduled inspection.

Full details of the Electricon Smoke Density Indicator CSB 7000 and the Electricon Smoke Alarm ASB 6500 can be obtained on request from the makers at the above address.

## **ROAD VEHICLES**

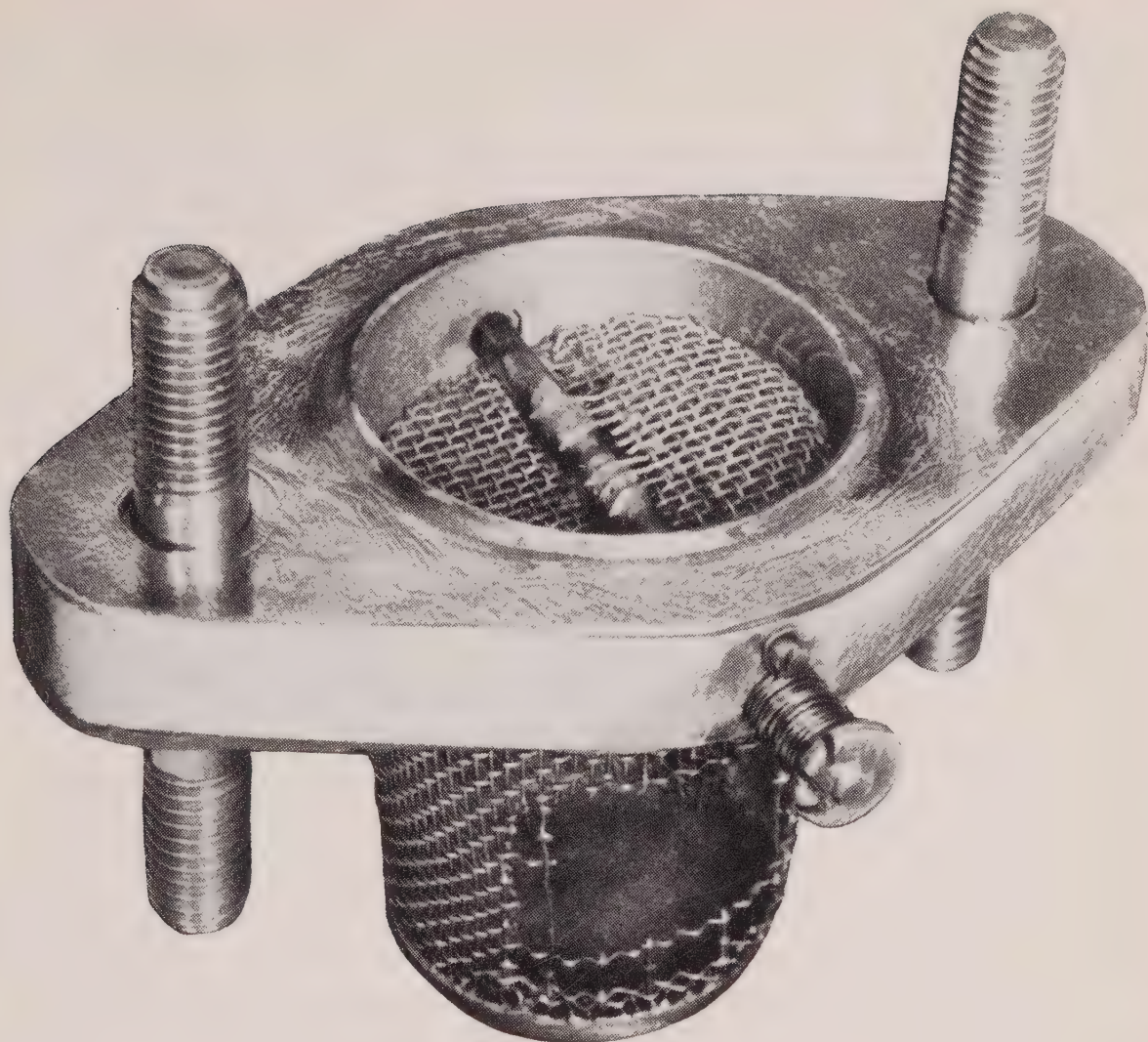
### **Cheaper Motoring—With a Real Chance to Cut Down Carbon Monoxide Exhaust**

*By John Little of Carburetion Units Limited*

Efforts by the motor industry to cut down exhaust emissions have so far been inconclusive, or expensive, or both. Whatever the health hazards may be—and we are still being told in some quarters that air pollution by motor vehicles is really nothing to worry about—there is no denying the evidence of one's own nose and lungs: exhaust emissions are an affront to our sense of civilized amenity.

Many of the devices which have been brought into service concentrate on the "effluent" end of the mechanical process—the emphasis is generally on after-burners. Carburetion Units Limited, after some six years of research, have produced a range of diffuser units designed both to cut down on carbon monoxide exhaust emissions and to save fuel, concentrating on the input end.





The Butterfly Diffuser Unit

The company are now in a position to announce what is potentially an important breakthrough in this field: a small and compact accessory, adaptable to any standard make of vehicle, which has proved itself capable of significant fuel economies coupled with a marked reduction in carbon monoxide exhaust.

The name of the device is the Butterfly Diffuser Unit (see accompanying photograph). In a series of independent and authoritative tests, it has cut CO exhaust emissions to less than 1%—which is below the 1970 standard embodied in the California legislation—without any loss in engine performance.

At the same time, the Butterfly Diffuser Unit has achieved an overall reduction in petrol consumption of 10%, besides reducing two of the principal causes of engine wear—crankcase oil dilution and carbonization of sparking plugs.

The Butterfly Diffuser Unit—scarcely bigger than a packet of 10 cigarettes and potentially of very low cost to the consumer—consists of two diffusers, one cradled inside the other, mounted inside a shallow packing block. Both diffusers are made of wire mesh or other perforated material. The unit fits snugly inside the inlet to the induction manifold, the packing block being sandwiched between the carburettor and manifold flanges, to which it is bolted.

The unit's primary functions are to increase the atomization of the fuel-air

mixture metered into the induction manifold by the carburettor, whilst reducing the deposit of neat fuel on the manifold's inner wall, and providing more even distribution of the fuel-air charge in multi-cylinder engines.

By extending the atomization process into the induction manifold, a greater proportion of fuel is suspended in mist form; and because of the reduced size of the fuel droplets, each droplet is surrounded by an increased number of air molecules, so providing the conditions for more complete combustion. In this way, the device carried on the good work initiated by the carburettor, but overcomes the intrinsic limitations posed by the manifold's normal conveyance of the fuel-air charge to the combustion chambers.

Briefly, the unit works on the principle of a perforated wire mesh screen, mounted on a spindle set at right-angles to the axis of flow of the fuel-air mixture into the induction manifold. This can clearly be seen in the photograph. The Butterfly's diffusing action is therefore essentially governed by the speed of the engine: the wire mesh offers varying diffusive surfaces according to the variations of pressure exerted by the fuel-air charge during all the sequences of driving. The Butterfly maintains volumetric efficiency at all times, whilst achieving maximum diffusion, the butterfly mesh being allowed to turn through 90 degrees about its spindle from a fully-closed position at tick-over to a fully-open position at speeds above 50 m.p.h.

These benefits are most apparent when driving in towns—where the effects of exhausts emissions are most concentrated. Both the independent testing organizations involved have confirmed a greater flexibility and smoothness when driving a Butterfly-fitted car through low and intermediate speeds.

The Butterfly Diffuser Unit has been refined and simplified through years of patient and exhaustive work to the point where it now emerges as a realistic and inexpensive aid to improved motoring. That improvement can be measured in terms of better performance, improved mileage per gallon, and not least the knowledge that the device is making a practical contribution to the campaign for clean air. Projects, look good. For the Butterfly offers these benefits with the minimum of maintenance and maximum durability. Once fitted—the fitting takes perhaps half an hour—the Butterfly has a proved life of at least 40,000 miles, and could well outlast many standard engines.

Moreover, the unit is well suited for the more sophisticated anti-pollutant systems which are likely to be required during the 1970s in the United States. Technically qualified opinion maintains that the best of the simple devices will have to be incorporated in a composite system, in order to satisfy the stringent U.S. legislation on emission tolerances in some five years' time.

Carburetion Units Ltd. are now offering the rights to manufacture and market these units (which are patented extensively at home and overseas). Already keen interest has been generated among several prospective licensees. With the right resources behind it, the Butterfly Diffuser Unit could quickly prove to be a winner for Britain—and for cleaner air.

## **COMPANY NEWS**

### **Reorganization at Watson House**

To ensure that the gas industry keeps pace with the changes and expansion currently taking place within it, the Gas Council research station at Watson House, Peterborough Road, Fulham, London, S.W.6. is being reorganized.



A total of 140 specialist staff from the former Research Division and Re-development Division have been grouped together to form a new Research and Development Division at Watson House. At the head of the new Division as Manager (Research and Development) is Mr. E. A. K. Patrick.

Working under Mr. Patrick will be Mr. G. A. Pickup, Chief Research Officer, Mr. E. W. G. Dance, Chief Development Officer, and Mr. J. A. Prigg, Chief Projects Officer. Mr. Pickup will be responsible for research into subjects which include combustion, fluid dynamics, heat transfer, materials and acoustics, while Mr. Dance will be responsible for development work on matters such as heat services, cooking and catering, engineering services and systems engineering.

Mr. Prigg will be able to call together specialist teams to deal with "crash programmes" of research into specific subjects. Apart from special assignments of this type, Mr. Prigg will be responsible for pre-development work and assessment of gases and burners.

Another major change at Watson House is the setting up of an Approvals and Installation Division to replace the former Approvals Testing Division. This Division will be headed by Mr. C. P. Henshilwood, Manager (Approvals and Installation), whose responsibilities will include evaluation of standards and codes of practice arising from the uses of town and natural gas, servicing, fitting and installation.

Working under Mr. Henshilwood will be Mr. A. E. Sharman, Chief Approvals Testing Officer, and Mr. B. C. Carter, Chief Standards and Liaison Officer. Mr. Sharman's responsibilities on gas appliances will include performance testing and electrical and mechanical testing. Mr. Carter will be responsible for approval methods and standards, installation and production standards and liaison with development.

## **New Edition of 'Better Home Heating for You'**

The Solid Smokeless Fuels Federation announce the publication of a new edition of "Better Home Heating For You", the companion volume to their very successful "Clean Air For You". Whereas "Clean Air" is produced mainly to assist Local Authorities and the public in the course of implementing Smoke Control Areas, the new and completely revised edition of "Better Home Heating" is aimed at a wider readership, and will prove to be of particular value to those members of the public with fuel conversion problems due to the run-down of gas coke.

Sections on smokeless open fires, roomheaters and independent boilers give full descriptions with simple diagrams showing how they work, and each section has comprehensive instructions on how to get the best out of each type of appliance. A useful table lists the fuels that can be burned in each appliance, and the correct size to use.

"Better Home Heating For You" will be distributed at Clean Air and Heating Exhibitions, and through offices of the National Coal Board. Supplies are also available to Local Authorities and other interested parties, on request to the Solid Smokeless Fuels Federations, York House, Empire Way, Wembley, Middx.

## **National Industrial Fuel Efficiency Service makes the Grade to go Commercial**

The National Industrial Fuel Efficiency Service, which, in the year ended 31 March, 1968, earned fees of £481,689, more than 25 times its first year's total

of £18,600, is to receive a measure of financial support from the Government over the next three years, after which its objective is to operate on a wholly commercial basis.

N.I.F.E.S., as its name implies, was formed at a time of energy shortage as a non-profit-making body to take over from the then Ministry of Fuel and Power the task of educating industrial, commercial and public authority users in the conservation and more efficient use of energy. It started with a guaranteed income of £450,000 contributed by the National Coal Board, the Electricity Authorities and the Gas Council and operated largely as a public service.

The financial support required has been steadily run-down to the £180,000 a year now provided by the sponsors, which is currently being devoted to non-fee-earning services such as the general promotion and development of fuel efficiency and higher productivity, educational and training programmes and co-operation with other organizations to promote advances in fuel technology.

Some of these activities of N.I.F.E.S., many of which are duplicated by the fuel industries themselves and by other bodies, will tail off over the next three years but as all expenditure under these heads cannot be immediately cut out and there will be a measure of staff redundancy involved, N.I.F.E.S. will be assisted over this period by a direct Treasury grant averaging up to £90,000 a year or half of the sum currently guaranteed by the nationalized fuel industries whose assistance will cease on 31 March, 1969. At the end of this three-year period in 1972—as the current flow of orders indicates—N.I.F.E.S. should be financially self-supporting.

It is the recognition by its many thousands of clients that N.I.F.E.S.' professional advice and services are worth paying for that has made possible the rapid growth in fee income leading to the Government's decision.

At a recent N.I.F.E.S. board meeting held at Abford House, Victoria, Mr. Leslie A. W. Jenkins, M.Inst.F., F.B.I.M., announced that he had heard from the British Productivity Council, that he, as Chairman, and the other Directors had been re-appointed for the year 1969.

## **The N.C.B. 'Housewarmer'**

On page 131 of our last issue we described the new N.C.B. "Housewarmer".

The National Coal Board have now asked us to state that they would be very pleased to discuss the use of this appliance further with any members of the Society or our readers. Apparently, several Public Health Inspectors with whom the N.C.B. are working during field trials in the Midlands are already conversant with the appliance, but the board are now anxious to establish contact with a wider public who may be interested in finding out more about this type of development. The board are willing to arrange a number of visits by parties to the N.C.B. Laboratory at Cheltenham, where the development work has taken place, or alternatively, they can make arrangements for an illustrated lecture with slides to be given at any Divisional meetings. Most of the test market operation will be set in the Midlands, and arrangements can be made for visitors to be entertained on the estates where a large concentration of appliances is being undertaken. Requests for such visits should be addressed to Mr. A. G. Shillingford at the office of the National Coal Board, Sherwood Lodge, Arnold, Notts.



# APPOINTMENTS

## **B.C.U.R.A.—Appointment of Public Relations Officer**

Miss Eileene M. Rosling, M.B.E., has been appointed Public Relations Officer within the Information Services of B.C.U.R.A.

After working with Professor D. T. A. Townend during the war years in the Department of Coal Gas and Fuel Industries, University of Leeds, Miss Rosling came to B.C.U.R.A. in 1946, when Dr. Townend was invited to become its Director General. She was Assistant to the Director General until Dr. Townend retired in 1962, since when she has been engaged mainly in public relations affairs.

She is a national Vice-Chairman of the Women's Advisory Council on Solid Fuel and is the Vice-Chairman of its London Regional Committee. She is an Associate of the Institute of Fuel, a member of the National Society for Clean Air, and was awarded the M.B.E. in 1963.

## **Gas Council Appoints Plant Construction Engineer**

The Gas Council has appointed Mr. L. Thompson, C.Eng., A.M.I.Mech.E., A.M.I.Struct.E., M.I.Gas.E., to the position of Plant Construction Engineer, Production and Supply Division, with effect from 17 February, 1969.

Mr. Thompson, aged 47, joined the Gas Industry in 1949 as Senior Draughtsman (Construction) South Eastern Gas Board. In 1952 he was appointed Site Engineer, West Surrey Division, and five years later became Site Engineer, Area Headquarters, Central Construction Department. In 1963 he was appointed Project Engineer, Area Headquarters, Central Construction Department, and a year later became Plant Construction Engineer responsible to the Assistant Chief Engineer (Construction) for the site construction work associated with a number of installations of varied design.

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## **Refuse and Clean Air**

Motherwell Bridge Tacol Limited have produced a film which illustrates vividly the new and revolutionary approach to refuse disposal known as the "Düsseldorf System". At the outset the film emphasises the threat to clean air posed by traditional methods of refuse disposal and shows how the proper incineration of town waste can be effected without causing air pollution.

Examples of the automated plant are shown and in each case the high chimney used testifies to clean operation being maintained. This system is already being used in a new town centre in this country\* and a much larger plant is being constructed in London. This film is of special interest to Public Health Engineers and Local Authorities who wish to turn their refuse disposal into a valuable asset.

*"No Tipping". 16 mm. Colour. Sound. Running time: 14 mins.*

*\* See page 154, Winter "Smokeless Air", 1968.*

# Air Pollution Abstracts

**1102. Some Medical Aspects of Aerosol Pollution Research.** Lawther, P. J., Ellison, J. McK. and Waller, R. E. (Proc. Roy. Soc. A. 1968. **307**. 223-234). The air in places of work often contains dusts and mists of specific industrial materials, and the effects of inhaling many such aerosols have been studied closely. Some of these studies throw light on the effects of the more complex mixed aerosols found in town air. In the investigation of respiratory diseases it is, however, often difficult to distinguish the effects of air pollution from those of other factors such as smoking or infection.

In this country most particles in town air come from the combustion of fuel. The inefficient combustion of coal or oil produces smoke consisting of particles of carbon and tarry droplets: efficient combustion yields little or no smoke, though some particles of ash may be dispersed into the atmosphere. Many fuels contain compounds of sulphur which burn to form sulphur dioxide, and some of this reacts in the air to form particles of ammonium sulphate and sulphuric acid. Aerosols can be produced by photochemical reactions between hydrocarbon vapours and nitrogen dioxide.

In this paper the physical and chemical characteristics of the particles in industrial atmospheres and in the general atmosphere of London are discussed, special references being made to their effects on normal people and on patients with lung disease.

**1103. Minimizing Air Pollution Control Costs.** Crocker, B. B. (Chemical Eng. Progress, 1968. **64**. No. 4. 79-86). Chemical Engineers have been slow to apply the same techniques to contaminant recovery that they have so successfully applied to chemical processing itself. The desirability of attacking air pollution control problems with a fundamental engineering analysis is demonstrated. The need to optimize both process and pollution control costs as a unit through a systems approach is pointed out. Case examples show how the application of engineering ingenuity and principles can result in low costs and more efficient contaminant control than can be obtained by merely relying on off-the-shelf standard designs.

**1104. Air pollution prevention in industry.** Technical and economic aspects. Vaillant, G. (in French). (Chimie et Industrie—Génie Chimique. Nov. 1968. **100**. No. 8. 1244-1249). In order to avoid air pollution becoming a national plague, due to industrial development and demographic expansion, it is becoming urgent to: (1) define a policy for preventing air pollution by stressing the aims to be reached and the technical means for obtaining them; (2) determine the financial aspect.

Using some concrete examples, the technical solutions for certain problems of industrial pollution and the economics are examined.

The investments needed are important and they are often unproductive, the government should grant its aid in order to develop research as well as to help the industrial (loans, subsidies, tax advantages) so that air pollution prevention becomes a reality.

**1105. A Method for detecting the biological effect of air pollutants by means of transplanted lichens.** (in German). Schönbeck, H. (Staub, Jan. 1969. **29**. No. 1. 14-18). The natural sensitivity of the leaf lichen *Parmelia physodes* to air pollutants can be used for their detection. For this purpose, the lichens are transplanted in many parallel lines on to boards made of wood or other suitable material (lichen exposure boards) and exposed in the area to be investigated at a height of 1.50 m. Their reactions are recorded photographically at definite intervals. The biological test values determined permit evidence of the existing emission load to be obtained, which can then be used in addition to the chemical air analysis.

**1106. Advantages of metal chimneys in dispersing pollutants.** Capponi, P. (La Rivista dei Combustibili. (Italy). June 1968. **22**. No. 6. 343-349). Health legislation in the more advanced countries shows a clear trend to increasingly stringent restrictions on permissible emissions at ground level, thus calling for intensive efforts to maximize the dispersion of pollutant in heating plant emissions. The emissions must therefore be dispersed at the greatest possible height: mainly by



designing higher stacks, but also by discharging the combustion gases at high speed. To meet these two conditions without unduly heavy expenditure, the brick chimney-stack must give way to the metal-structure type, which enables separating the bearing structure from the actual flue exhausting the smoke. Maintenance is easier for this type of stack and they can also be used, if necessary, for cleaning smoke before it is discharged. Moreover, periodical inspection is made easier and weather reports can be logged from instruments installed on these stacks, a technique that cannot be neglected at today's rate of progress.

**1107. Testing on Sulphur Dioxide Removal from Gases by a Dry Ammonia Method.** (In Polish.) Andrzejewski, R. et al. (*Ochrona Powietrza*. 1968. 2. No. 4. 2-9). Results of testing carried out in the years 1961-63 on methods of sulphur dioxide removal from gases diluted by the effect of gaseous ammonia, are reported in this paper. The basis for this method is the possibility of direct precipitation of sulphur dioxide in the form of a solid phase composed from ammonium sulphites and sulphates. Precipitation efficiency of sulphur dioxide depending on the initial  $\text{SO}_2$  concentration, gas temperature and gas humidity was tested. Positive and negative aspect of this method are characterized and two operative methods of its performance are considered. Results obtained by the effect of ammonia in presence of ozone are discussed.

**1108. The distribution of surface concentrations of sulphur dioxide emitted from tall chimneys.** Moore, D. J. (Meeting "Recent Research in Air Poll". 14 Nov. 1968, to be published 1969 in *Philosophical Transactions of the Royal Society*.) The observed mean values of the maximum surface sulphur dioxide concentration from generating station plumes (stack height 100 m and above) exhibit a marked dependence on wind speed. At night, the lowest concentrations occur in light winds, and the concentration increases almost linearly with wind speed up to speeds of  $14 \text{ m s}^{-1}$  at stack top. In the daytime the lowest concentrations occur at about  $5 \text{ m s}^{-1}$  with a secondary maximum in light winds.

The distributions of the individual hourly mean values in both light and strong winds will be discussed and some practical methods for predicting these distributions will be suggested.

**1109. The Application of Air Pollution Research to Power Station Design.** Clarke, A. J. (Meeting "Recent Research in Air Poll". 14 Nov. 1968, to be published 1969 in *Philosophical Transactions of the Royal Society*). The paper outlines the fundamental principles which govern the application of air pollution control techniques to power stations. From these are derived the primary objectives of the research which has been conducted to improve the design of chimneys, arrester plant, instruments and ancillary equipment. The degree to which these objectives have been reached will be discussed.

Another important aspect of research has been the accumulation of factual data on the extent to which power stations contribute to air pollution in their near vicinity, and on a national scale. These data have provided reassurance, both within and outside the industry, on the adequacy of the control measures adopted.

The paper concludes by discussing the many factors which must be taken into account in reaching engineering decisions in this complex field, and the assistance given by scientific research is thereby placed in perspective.

**1110. Recent Advances in Electrostatic Precipitators for Dust Removal.** Lowe, H. J. (Meeting "Recent Research in Air Poll". 14 Nov. 1968, to be published 1969 in *Philosophical Transactions of the Royal Society*). Electrostatic precipitation is a vital process for industries such as the cement, steel and electricity supply which have to remove large quantities of dust from effluent gases.

In conjunction with the use of single high chimneys, the C.E.G.B., has adopted a standard of 99.3 per cent efficiency for dust removal plant in its modern p.f. generating stations. On a typical 2000 MW station, about 330 million cubic feet of flue gas containing some 100 tons of fly ash have to be treated per hour; the precipitators have a dust receiving area of the order 1.7 million sq. ft. and, together with the dust handling plant, cost about £3 million, i.e. about  $3\frac{1}{4}$  per cent of the complete boiler contract. The total amount of fly ash removed annually on all the C.E.G.B.'s p.f. stations is about 7 million tons.

Apart from the increased size of plant, the following significant changes have taken place in recent years.

- (1) Straight electrostatic precipitators have entirely replaced combined cyclone/precipitator units since the cyclones only remove the coarse fraction, which

is easily extracted by the precipitator, and leave a fine dust which is more difficult to remove from the electrodes.

- (2) Flat receiving electrodes have replaced the more complicated patterns, it having been established that they are just as effective and considerably cheaper.
- (3) Gas treatment velocities have been increased from about 5 to 6 ft./s on the evidence of pilot-scale experiments.
- (4) Solid-state rectifiers have superseded the rotary type.
- (5) Automatic control of the high-voltage electrical supply is now standard practice.

**1111. Reduction of Emissions of Sulphur Dioxide.** Masterson, H. G. (Meeting "Recent Research in Air Poll". 14 Nov. 1968, to be published 1969 in Philosophical Transactions of the Royal Society). Many processes have been proposed to limit sulphur emissions from combustion processes, relying either on cleaning the fuel or the combustion gas. The smaller scale of operation involved in removing sulphur from the fuel suggests that this may be a more economic approach, but in practice the distribution of sulphur in coal makes separation inefficient, while de-hydro-sulphurization of fuel oil is costly.

Flue gases have been washed with various alkaline solutions. In some the sulphur product is discarded; in others, a commercial product is recovered. An inherent disadvantage of wet washing is the loss of thermal buoyancy of the plume.

Solid absorbents cheap enough to discard with the sulphur, e.g. dolomite, generally react too slowly. The higher cost of better absorbents such as sodium aluminate necessitates plant for regeneration to permit absorbent recycling and sulphur recovery. Economic viability of such processes depends on the small difference between the chemical plant costs and the value of the recovered sulphur product.

Catalytic processes lead either to sulphuric acid by oxidation or elemental sulphur by reduction. Their cost is critically dependent on catalyst endurance.

**1112. An Appraisal of Rule 66 of the Los Angeles County Air Pollution Control District.** Krenz, W. B. et al. (J. Air Poll. Contr. Ass., Nov. 1968. **18**, No. 11. 743-747). Emissions of organic solvents to the atmosphere of Los Angeles County are currently estimated at 600 tons per day.

In order to reduce these emissions, Rule 66 was enacted on 28 July, 1966, after more than a year of joint effort by industry and the A.P.C.D.

This paper explains the provisions of the rule, describes how its enforcement will affect industry and the entire community, and discusses the methods being utilized by industry to bring its various operations into compliance.

The unique approach, or philosophy, upon which this rule is based is compared with that of representative types among the many which comprise the Rules and Regulations of the Air Pollution Control District.

**1113. Development of a Smoke Guide for the Evaluation of White Plumes.** W. D. Conner, et al. (J. Air Poll. Contr. Ass., Nov. 1968. **18**, No. 11. 748-750). A smoke guide for use with white plumes has been developed by suspending size-graded industrial diamond dust in transparent plastic blocks. The guide consists of a series of four blocks containing dusts with white light transmittances of 20, 40, 60 and 80 per cent and scattering characteristics similar to those of white (oil) plumes commonly used for training smoke inspectors. The luminances of experimental plumes and guides with like transmittances are compared when viewed under different illuminating and viewing conditions. Similar tests with a U.S. Public Health Service Black Smoke Guide are also described.

**1114. Air Pollution. Desulphurization and the petroleum industry.** Meredith, H. H. Jr., and Lewis, W. L. (Chem. Eng. Progr. Sept. 1968. **64**, No. 9. 57-59). In the normal upgrading of its products, the petroleum industry has long been interested in reducing the sulphur content of fuels. Although few localities have restrictions on fuel oil sulphur content at present, more regulations are expected and must be anticipated if present investments in desulphurization facilities are to be utilized efficiently. No commercial demonstrations have been made for removal of sulphur other than concentrating it in nonfuel bottoms or combining it with hydrogen. A low-cost source of hydrogen is a must for economical desulphurization of fuel oil. Natural gas is the best source of hydrogen so the most economical hydrogen plant can be constructed where there is an abundance of low-cost gas. As far as Caribbean residual fuels are concerned, the combination of factors is such that desulphurization facilities would not be



considered at any site except at the refinery where the residue was produced. (APCA ABS Abstract No. 10441.)

**1115. Air Pollution. Iron pyrites from high sulphur coals.** Putnam B. and Manderson M. (Chem. Eng. Progr. Sept. 1968. **64**, No. 9. 60-65). The major sources of sulphur dioxide emission are coal fired power generation facilities, followed by other industrial facilities and space heating. It also appears that power plants will become increasingly important potential contributors of SO<sub>2</sub> emissions. Therefore, reduction of emissions from coal-fired power generation facilities is of great concern. The National Center for Air Pollution Control authorized Arthur D. Little, Inc., and Dorr-Oliver, Inc., to investigate the economics of utilizing iron pyrites (FeS<sub>2</sub>) obtained from coal beneficiation. The evaluation includes technical, marketing and economical considerations and emphasizes the three major coal producing regions in the U.S. believed to have significant quantities of pyrite associated with the coal: Central Pennsylvania, Southern Illinois and North-East Ohio. (APCA Abstract No. 10442.)

**1116. The Meteorology and Vertical Distribution of Pollutants in Air Pollution Episodes in Philadelphia.** Davis, F. K. and Newstein, H. (Atmos. Environ. Nov. 1968. **2**, No. 6. 559-574). An analysis is

presented here of the general weather patterns, the vertical temperature structure and the wind conditions associated with two periods of high air pollution concentrations in Philadelphia.

Measurements of the vertical distribution of pollutants and their variations are presented for the second period.

**1117. Plume Rise Measurements at Industrial Chimneys.** Bringfelt, B. The Swedish Meteorological and Hydrological Inst., Stockholm, Sweden. (Atmos. Environ. Nov. 1968. **2**, No. 6. 575-598). The results of about 70 measurements of smoke plume rise from industrial chimneys are described. The experimental technique was as follows:

The smoke plume was photographed repeatedly from a small aeroplane during a period of about one hour. The mean plume rise was evaluated at fixed distances from the source using several photographs taken during the test. A survey and a comparison are given of the various very different methods which have previously been used for measuring plume rise. When plotting all available plume rise data measured at fixed distances and a sampling period of  $\frac{1}{2}$ -1 hr. against chimney gas heat emission significant regression lines are obtained. The scatter of the points is large but this representation is useful for a first general estimation of plume rise.

# SMOKE CONTROL AREAS

## Progress Report

Position at 31 December 1968—TOTALS

	England	Wales	Scotland	Northern Ireland
<b>Smokeless Zones (Local Acts) in Operation</b> ..	44	—	1	—
<i>Acres</i> , 3,400 .. ..				
<i>Premises</i> , 41,060 .. ..				
<b>Smoke Control Areas in Operation</b> .. ..	2,707	6	121	9
<i>Acres</i> .. .. .	685,498	418	66,001	4,616
<i>Premises</i> .. .. .	3,628,682	2,352	310,510	1,496
<b>Smoke Control Orders</b>				
<i>Confirmed</i> .. .. .	199	1	12	5
<i>Submitted</i> .. .. .	104	—	9	1
<b>Grand Totals</b> ..	3,054	7	143	15

### Smoke Control Position in Regions of England at 31 December 1968

(Figures supplied by Ministry of Housing and Local Government)

(1)  <i>Region</i>	(2) <i>No. of black area acres covered by smoke control orders con- firmed or awaiting decision</i>	(3) <i>Percentage* of total black area acreage in region so covered</i>	(4) <i>No. of black area premises covered by smoke control orders confirmed or awaiting decision</i>	(5) <i>Percentage* of total black area premises in the region</i>
Northern .. ..	26,160	20·87	127,852	23·12
Yorkshire and Humberside .. ..	152,129	40·40	510,709	43·73
East Midlands .. ..	50,128	18·68	160,499	31·36
Greater London .. ..	213,164	65·18	1,910,632	72·39
North Western .. ..	153,983	38·38	687,046	40·35
West Midlands .. ..	75,436	30·29	332,761	31·65
South Western .. ..	7,201	27·33	26,650	17·89
Total (black areas)	678,201	38·28	3,756,149	48·31
Outside black areas	126,236		413,933	
<b>GRAND TOTALS</b>	804,437		4,170,082	

\* The percentage shown in columns (3) and (5) above are percentages of the *total* acreage and of the *total* number of premises in the black areas concerned. In practice it may not always be necessary for the whole of the black area authority's district to be covered by smoke control orders (e.g. there may be some areas of open country).

NOTE.—Statistics in respect of Wales and Monmouthshire are no longer included.



# NEW SMOKE CONTROL ORDERS

*The lists below are supplementary to the information in the last issue of Smokeless Air (Winter 1968) which gave the position up to 30 September, 1968. They now show changes and additions up to 31 December, 1968.*

*Some of the areas listed are new housing estates, or areas to be developed for housing. The total number of premises involved will therefore increase. An asterisk denotes that there have been objections and that a formal inquiry has been or will be held.*

*The list of new areas in operation of smoke control is based on the plans submitted to the Ministry of Housing but may erroneously include some local authorities who have made postponements, without notifying the Ministry of the fact.*

## ENGLAND NEW SMOKE CONTROL ORDERS IN OPERATION

### Northern

#### *Tyneside and Wearside*

Boldon U.D. Nos. 6 and 7. South Shields C.B. No. 2. Whickham U.D. Nos. 5-7.

#### *Teeside*

Darlington C.B. Red Hall, Darlington C.B. Lascelles Park. Hartlepool C.B. Nos. 11 and 12. West Hartlepool C.B. No. 7.

### Yorkshire

#### *West Riding (North)*

Aireborough U.D. No. 23. Baildon U.D. No. 10. Heckmondwike U.D. No. 7. Horsforth U.D. No. 26. Leeds C.B. Nos. 67-70. Mirfield U.D. No. 9. Ossett B. No. 11. Shipley U.D. No. 9. Sowerby Bridge U.D. Nos. 5 and 6.

#### *West Riding (South)*

Dearne U.D. (Thurnscoe No. 2). Mexborough U.D. No. 1a. Sheffield C.B. No. 26. Wombwell U.D. No. 1.

### North Western

#### *South Lancashire and North-East Cheshire*

Atherton U.D. No. 4. Bolton C.B. Foster Lane. Chadderton U.D. No. 9. Failsworth U.D. No. 7. Golborne U.D. No. 1. Oldham C.B. No. 15. Rochdale C.B. (Deeplish and Stoneyfield). Royton U.D. No. 4. Salford C.B. No. 15. Stockport C.B. (Hollywood/Heaton Lane). Stretford B. No. 12. \*Tottington U.D. No. 1. Tyldesley U.D. No. 1. Whitefield U.D. No. 9. Worsley U.D. No. 5.

#### *Central Lancashire*

Accrington B. Nos. 3, 6 and 7. Blackburn C.B. No. 8. Colne B. No. 6. Darwen B. No. 3a. Fulwood U.D. No. 2. Rishton U.D. No. 1.

#### *Merseyside*

Ellesmere Port B. No. 8. \*St. Helens C.B. No. 5a. Wallasey C.B. No. 13.

### Midlands

#### *Derby, Nottingham and Chesterfield*

Beeston and Stapleford U.D. No. 9. Chesterfield R.D. No. 10. Derby C.B. No. 11. \*Derby C.B. No. 12. \*Derby C.B. No. 13. \*Mansfield Woodhouse U.D. No. 1.

#### *North Midlands*

Leicester C.B. Nos. 19-24.

#### *West Midlands*

Bedworth U.D. No. 2. Birmingham C.B. Nos. 149 and 151. Dudley C.B. No. 50. \*Halesowen B. No. 9. Nuneaton B. No. 5. Stourbridge B. No. 27. Walsall C.B. No. 12. West Bromwich C.B. No. 17.

### London

#### *Greater London Boroughs*

Barnet L.B. No. 7. Bexley L.B. No. 8. Bromley L.B. Nos. 7-9. Camden L.B. (Hampstead Nos. 11 and 12). Camden L.B. (St. Pancras No. 9). Ealing L.B. Nos. 35-37. Enfield L.B. No. 16. Greenwich L.B. (Charlton). Haringey L.B. (Tottenham No. 8). Haringey L.B. (Hornsey No. 10). Harrow L.B. No. 16. Havering L.B. No. 4. Hillingdon L.B. No. 10. Hounslow L.B. (Brentford and Chiswick No. 9). Hounslow L.B. (Heston and Isleworth No. 2). Hounslow L.B. (Heston and Isleworth No. 37). Hounslow L.B. (Feltham No. 8). Islington L.B. Nos. 26 and 27. Kensington and Chelsea L.B. (Brompton/Queen's Gate). Kingston-upon-Thames L.B. Nos. 11-13. Lambeth L.B. No. 20. Merton L.B. Nos. 7 and 8. Newham L.B. No. 5. Redbridge L.B. No. 14. Richmond-upon-Thames L.B. (Twickenham No. 7). Richmond-upon-Thames L.B. (Richmond No. 9). Richmond-upon-Thames L.B. (Barnes No. 9). Southwark L.B. Nos. 23 and 24. Sutton L.B. Nos. 17 and 18. Waltham Forest L.B. No. 13. Wandsworth L.B. No. 2. Westminster L.B. Maida Vale South.

#### *Outer London*

Dartford R.D. Swanley (West). Dartford R.D. The Bean. Dartford B. No. 7.

### **Local Authorities Outside the Black Areas**

Basildon U.D. No. 7. Cheltenham B. Nos. 2 and 3. Grantham B. No. 13. Hazel Grove and Bramhall U.D. No. 3. Meriden R.D. No. 2. Old Fletton U.D. (Stan-ground No. 6). Old Fletton U.D. (Wood-ston No. 7). Oxford C.B. No. 7. Rugby B. No. 9. Skelmersdale U.D. No. 3. Slough B. No. 12. Southampton C.B. No. 6. Stokesley R.D. Hemlington Park. Tamworth B. No. 1. Whitley Bay B. No. 4. Wilmslow U.D. No. 12.

### **NEW SMOKE CONTROL ORDERS CONFIRMED BUT NOT YET IN OPERATION**

#### **Northern**

##### *Tyneside and Wearside*

Boldon U.D. Nos. 8–12. Gateshead C.B. No. 12. Newburn U.D. Nos. 9 and 10. South Shields C.B. No. 3.

##### *Teeside*

Teeside C.B. No. 1.

#### **Yorkshire**

##### *West Riding (North)*

Aireborough U.D. No. 24. Batley B. No. 7. Bingley U.D. No. 14. Dewsbury C.B. Central Area. Horbury U.D. No. 6. Huddersfield C.B. (Lindley–Birchcliffe). Keighley B. No. 7. Leeds C.B. No. 73. Pudsey B. No. 7.

##### *West Riding (South)*

Barnsley C.B. Nos. 8 and 9. Sheffield C.B. No. 19. Swinton U.D. No. 13.

#### **North Western**

##### *South Lancashire and North-East Cheshire*

Bolton C.B. (West Ward No. 4). Bolton C.B. (Ladybridge No. 2). Bolton C.B. (Morris Green). Bolton C.B. (Moorfield and Firwood). Denton U.D. No. 10. Dukinfield B. No. 13. Horwich U.D. No. 1. Hyde B. No. 6. Leigh B. No. 9. Prest-wich B. No. 8.

##### *Central Lancashire*

Blackburn C.B. No. 9. Nelson B. No. 4.

##### *Merseyside*

Bootle C.B. (Sefton Estate). Bootle C.B. No. 9. Liverpool C.B. No. 27. \*Runcorn U.D. No. 4. Runcorn U.D. No. 5.

#### **Midlands**

##### *Derby, Nottingham and Chesterfield*

Derby C.B. Nos. 15–17. \*Hucknall U.D. No. 2. Sutton-in-Ashfield U.D. No. 1.

##### *West Midlands*

Aldridge-Brownhills U.D. Nos. 28 and

29. Warley C.B. Nos. 1–3. Wolverhampton C.B. No. 13.

##### *Potteries*

Stoke-on-Trent C.B. No. 21.

#### **London**

##### *Greater London Boroughs*

Barnet L.B. No. 8. Brent L.B. No. 6. Ealing L.B. No. 40. Greenwich L.B. (West Greenwich). Harrow L.B. No. 18. Hillingdon L.B. No. 11. Kensington & Chelsea L.B. (St. Charles No. 1). Kingston-upon-Thames L.B. Nos. 14 and 15. Merton L.B. No. 12.

### **Local Authorities Outside the Black Areas**

Bedford B. Nos. 5 and 6. Blaby R. D. No. 5. Canterbury C.B. (Military Road No. 1). Canterbury C.B. (Folly Farm No. 2). Corby U.D. No. 2. Darlington R.D. Newton Aycliffe No. 4. Easthampstead R.D. (Bracknell No. 1). Exeter C.B. (Pinhoe No. 1). Exeter C.B. (St. Thomas No. 2). Grantham B. No. 14. Hazel Grove No. 4. Heanor U.D. No. 3. Hemel Hempstead Chaulden No. 2. High Wycombe B. No. 16. Ramsbottom U.D. No. 2. Seisdon R.D. No. 2. (Wombourne). Swadlincote U.D. No. 1. Thurrock U.D. No. 6. Watford B. No. 8. Watford B. Harwoods No. 6. Whitley Bay B. No. 5.

### **NEW SMOKE CONTROL ORDERS SUBMITTED BUT NOT YET CONFIRMED**

#### **Northern**

##### *Tyneside and Wearside*

Boldon U.D. No. 13. Hebburn U.D. No. 11. Tynemouth C.B. No. 8. Whickham U.D. No. 8.

##### *Teeside*

Teeside C.B. Nos. 2 and 3.

#### **Yorkshire**

##### *West Riding (North)*

Bingley U.D. No. 16. Brighouse B. No. 14. Horsforth U.D. No. 28. Leeds C.B. Nos. 74 and 75. Mirfield U.D. No. 10. Sowerby Bridge U.D. No. 7. Stanley, Shield Row No. 1. Stanley U.D. (Yorks) No. 3.

##### *West Riding (South)*

Dearne U.D. No. 3. Doncaster C.B. No. 11. Sheffield C.B. No. 24. Wombwell U.D. No. 2.

#### **North Western**

##### *South Lancashire and North-East Cheshire*

Ashton-under-Lyne B. No. 9. Droylesden U.D. No. 13. Eccles B. Nos. 10 and



11. Failsworth U.D. No. 8. Kearsley U.D. No. 3. Radcliffe B. No. 5. Royton U.D. No. 5. Stockport C.B. (Brinnington). Stretford B. No. 13. Wigan C.B. No. 6. Worsley U.D. No. 7.

*Central Lancashire*

Barrowford U.D. No. 2. Brierfield U.D. No. 4. Great Harwood U.D. No. 1.

*Merseyside*

Ellesmere Port B. No. 9. Litherland U.D. No. 2. St. Helens C.B. No. 6a.

**Midlands**

*Derby, Nottingham and Chesterfield*

Beeston and Stapleford U.D. No. 10. Carlton U.D. No. 5. Derby C.B. No. 18. Ilkeston B. Nos. 3 and 4.

*North Midlands*

Leicester C.B. Nos. 25 and 26.

*West Midlands*

Bedworth U.D. No. 3. Nuneaton B. No. 6. Sutton Coldfield B. No. 13. Warley C.B. Nos. 4-8.

*Potteries*

Newcastle-under-Lyne B. No. 8.

**London**

*Greater London Boroughs*

Barnet L.B. No. 9. Ealing L.B. Nos. 41 and 42. Harrow L.B. No. 9. Hounslow L.B. (Feltham No. 9). Hounslow L.B. (Brentford and Chiswick No. 10). Hounslow L.B. (Heston and Isleworth Nos. 35 and 36). Hounslow L.B. (Heston and Isleworth No. 13). Newham L.B. No. 6. Redbridge L.B. No. 15. Richmond-upon-Thames L.B. (Barnes No. 10). Richmond-upon-Thames L.B. (Twickenham No. 8). Southwark L.B. No. 25. Sutton L.B. No. 19. Waltham Forest L.B. No. 15.

*Outer London*

Dartford R. D. The Swanley, East and Central.

**Local Authorities Outside the Black Areas**

Basildon U.D. No. 8. Canterbury C.B. No. 3. Cheltenham B. No. 5. Gillingham B. No. 5. Glossop B. No. 3. Grantham B. Nos. 15 and 16. Lancaster C.B. Nos 5 and

6. Lincoln C.B. No. 2. Luton C.B. No. 7. Potters Bar U.D. No. 3. Reading C.B. No. 13. Skelmersdale and Holland U.D. Nos. 4 and 5. Skipton R.D. (Sutton No. 1). Staines U.D. No. 10. Stanley U.D. (Durham) No. 2. Tamworth B. No. 3. Warrington R.D. No. 3. York C.B. No. 1.

**SCOTLAND**

**NEW SMOKE CONTROL ORDERS  
IN OPERATION**

Clackmannan County (Tullibody). Clydebank (No. 6 Parkhall). Dundee (Law) Falkirk No. 8. Galashiels (High Road). Galashiels (Balmoral). Grange-mouth (Newlands). Renfrew Burgh No. 4.

**NEW SMOKE CONTROL ORDERS  
CONFIRMED BUT NOT YET IN  
OPERATION**

Falkirk No. 7. Glasgow (Fairfield). Glasgow (Whiteinch).

**NEW SMOKE CONTROL ORDERS  
SUBMITTED BUT NOT YET  
CONFIRMED**

Bearsden Westerton. Fife County (Dalgety Bay New Town). Galashiels (Wood St/5th Ward). Port Glasgow No. 4.

**NORTHERN IRELAND**

**NEW SMOKE CONTROL ORDERS  
IN OPERATION**

Antrim R.D. No. 1. Craigavon No. 1. Lurgan Boro. No. 1. Newtownabbey U.D. Nos. 1 and 2. Portadown Boro. No. 1.

**NEW SMOKE CONTROL ORDER  
CONFIRMED BUT NOT YET IN  
OPERATION**

Castlereagh R.D. No. 3.

**NEW SMOKE CONTROL ORDER  
SUBMITTED BUT NOT YET  
CONFIRMED**

Belfast County Borough No. 2.

# **CLEAN AIR CONFERENCE AND EXHIBITION**

## **EASTBOURNE**

### **21—24 October 1969**

<i>Conference</i>	—	<b>Congress Theatre</b>
<i>Exhibition</i>	—	<b>Devonshire Park</b>

At the Conference, subjects discussed will include the air pollution problems of cement works, the brick and ceramic industries, iron and steel works and oil refineries; the sulphur oxides and oil fuels and the medical aspects of air pollution. There will also be an open session on a clean air environment for the future.

Visitors to the Exhibition will be able to see the latest developments in fuels and appliances and in the products displayed by the leading manufacturers of air pollution control equipment, instruments, incinerators, etc.



# Information available for clean air campaigns



## EXHIBITION

A complete pre-fabricated and self-contained "Clean Air" Exhibition: adaptable in size with one, two, three or four approved smokeless appliances under fire, and displays of the smokeless fuels available in the district

## MOBILE UNITS

Manned with technical demonstrators, to advise and help residents in proposed or newly-formed Smoke Control Areas. They incorporate approved appliances under fire and a display of the solid smokeless fuels

## DISPLAYS

A range of portable units variously displaying instructional panels dealing with Clean Air and the Act, a typical central heating unit, fuel displays and literature displays

## LITERATURE


Informative literature is available free to Local Authorities explaining the Clean Air Act, and giving full information on solid smokeless fuels and the appliances

The comprehensive services offered free by the Solid Smokeless Fuels Federation can make an invaluable contribution to "Clean Air" campaigns, the implementation of Smoke Control Areas, and the organization of House Improvement or Conversion schemes. Local Authorities who are interested in utilizing the aids shown above are invited to apply to:

**SOLID SMOKELESS FUELS FEDERATION**

York House, Empire Way, Wembley, Middlesex

S57



# To some, a memory

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vide full advice and design services for all new housing development schemes.

**And in industry:** Shell-Mex and B.P. make available technical advice and assistance on all matters concerning storage, handling, and the application of oil fuel to minimise air pollution.

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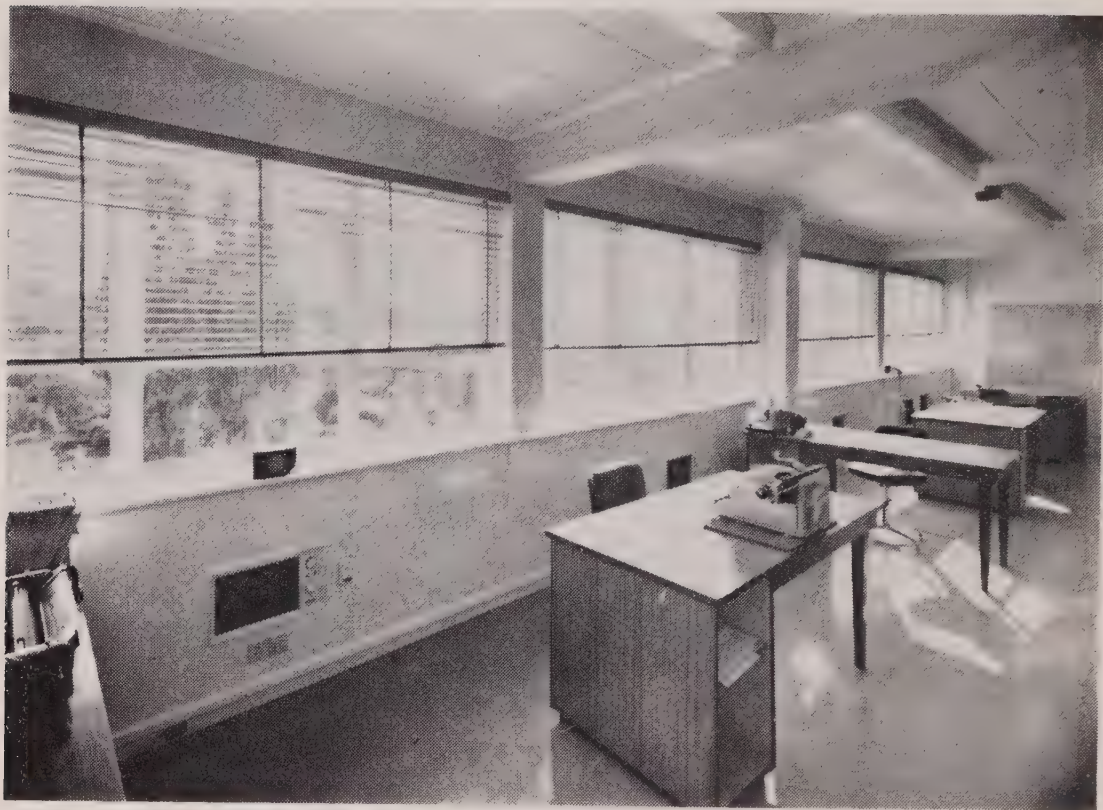
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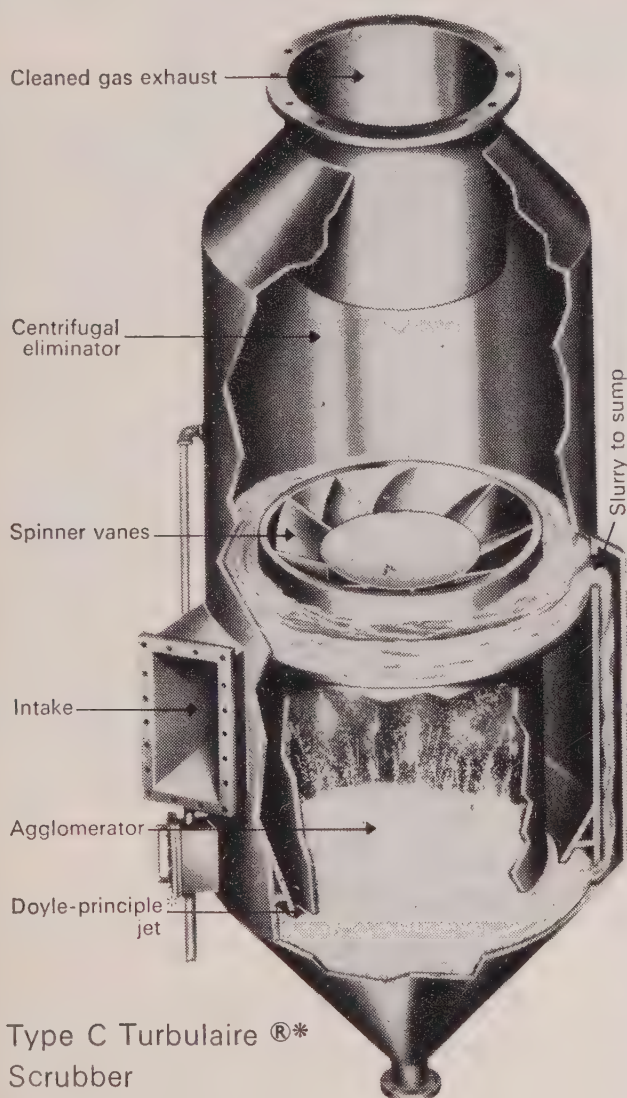


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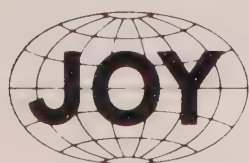
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- 4** Wide open design eliminates plugging—cleans gases containing over 20 grs/cf of dust without need for pre-cleaners.
- 5** Pressure drop and efficiency custom engineered to meet each individual application.
- 6** Simple field modification adapts unit to maintain constant efficiency at varying volumes.
- 7** Can be furnished in a variety of materials for corrosion resistance, etc.
- 8** Three space-saving configurations; same principle, same efficiency.
- 9** Low wet-zone velocities eliminate attack by abrasive slurries.
- 10** Delivers cleaned, cooled gas to stack or process.

\* U.S. Patents 2,621,754 and 2,720,280

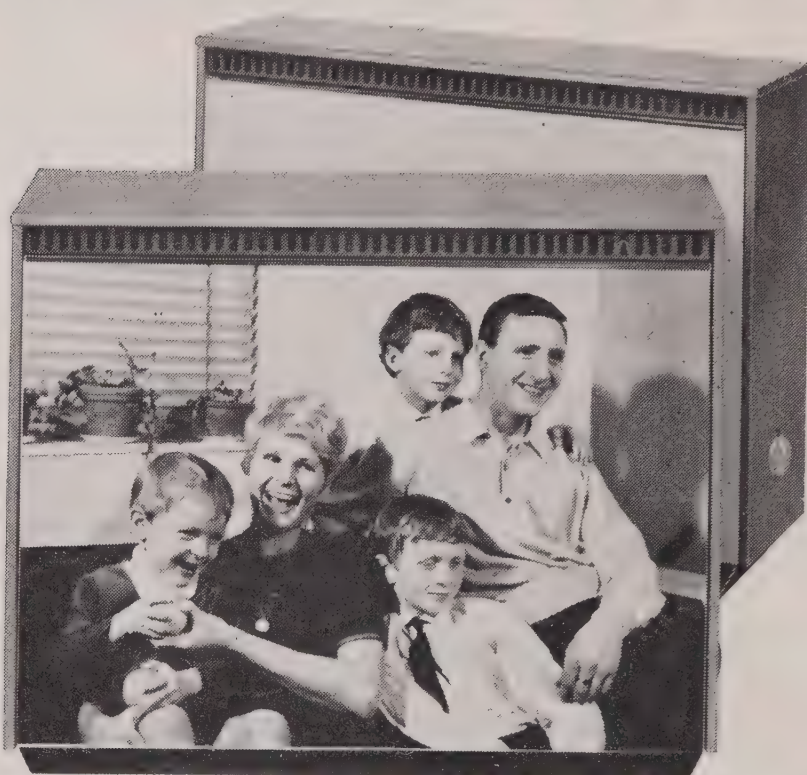


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Manufacturers of electrical precipitators, mechanical dust collectors, gas scrubbers and high temperature filters.

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For clean air areas, the most natural choice is Electricity for space heating, water heating and air conditioning in the home, in industry and commercial buildings. Electricity is the only fuel that causes no combustion. It's always there to be switched on. Nothing to store. Nothing to dispose of.

## **Electric Central Heating**

Automatic, simpler and cheaper to install than other systems. Runs on special low rates, and, of course, complies with the Clean Air Act.

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**Electricaire** Warm Air Central Heating by Electricity. Essentially a centrally sited storage heater with

warm air through ducts—controllable room by room. Ideal for new property.

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**Air Conditioning** Gives maximum effect to controlling environmental conditions in offices, shops, hotels and public buildings.

## **Better things are electric**

*Issued by the Electricity Council, England and Wales*



# **Nottingham City Council saved £35,500 by installing the Baxi Fantom.**

## **What about your smokeless zone?**



The Fantom is the cheering, heart-warming answer to the cold facts of the Clean Air Act. Now, no one need give up a real living open fire even in a smokeless zone. The Fantom has been designed in conjunction with the National Coal Board.

The Fantom's secret is its built-in electric fan that streams air up through the fuel, noiselessly, continuously, and controllably. Switch on, and all smokeless fuels burn brightly, to give a glowing, living open fire.

They started installing 3,500 Fantom fires in the Bilborough, Beechdale, area of Nottingham early last year to be ready in time for the zone going smokeless in June, 1968. Installation was completed three months ahead of schedule. Because of the fact that the Fantom is so easy to install—literally only 2 screws are needed—fitters were putting in 11 or 12 fires a day. So Nottingham City Council saved even more money in labour time. Nottingham isn't the only 'Fantom Town'. Many others are also installing Fantoms.

### **What a council gains: Nearly £10 on every appliance**

With an average installed cost of only £15.0.0, the Fantom is easily £10 cheaper than any other domestic appliance designed and guaranteed to burn smokeless fuels brightly.

May we give you a demonstration?

Please write to:  
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Bamber Bridge, Preston, Lancs.  
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**Baxi Fantom**  
the power behind the living fire

# More and more local authorities are heating with

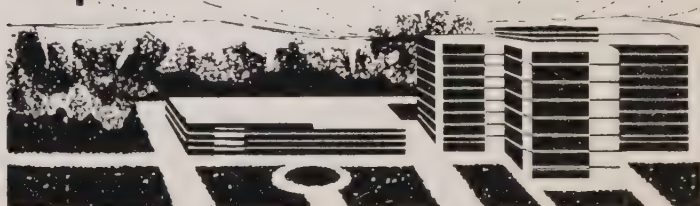
## **REXCO** Smokeless coal



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### Hospitals



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clean, economical **REXCO**

REXCO is made from top grade coal — officially approved for use in Smokeless Zones. It's economical too—because it's long-burning and stores well. It's easy to

light and to maintain.

REXCO is easily ordered from coal merchants or the National Coal Board.

For further advice contact:

**National Carbonising Company Ltd. Mansfield, Notts.**  
**Scottish Rexco Ltd. Comrie's Colliery, Oakley, Fife.**

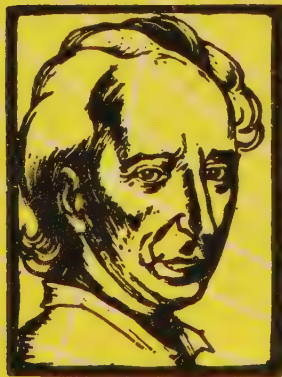
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**Telephone Saline 345/6**

## It's Time to Change to Rexco — It's Smokeless!



# **SMOKELESS AIR**

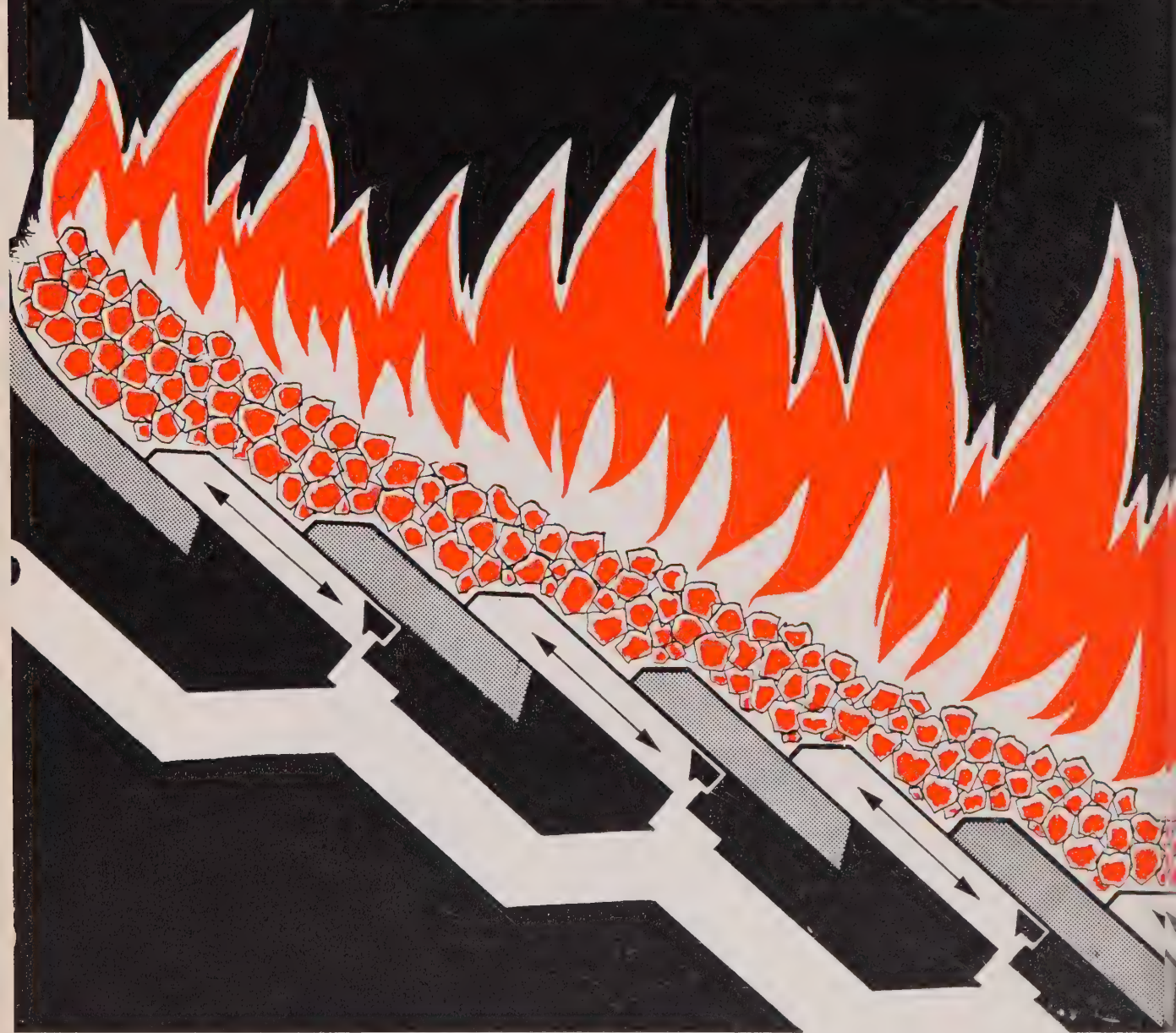
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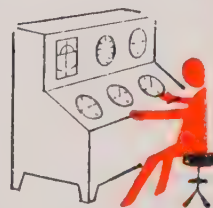
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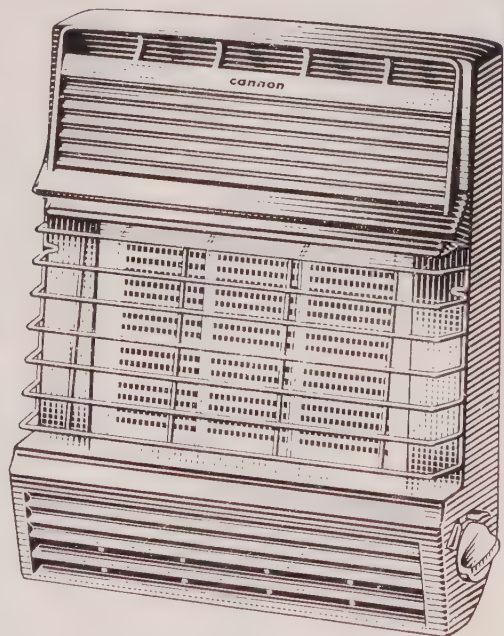
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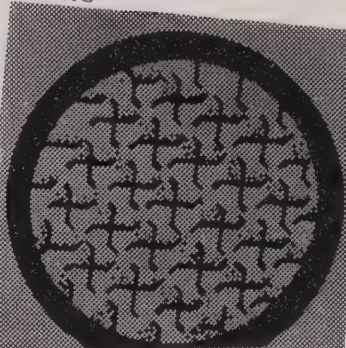
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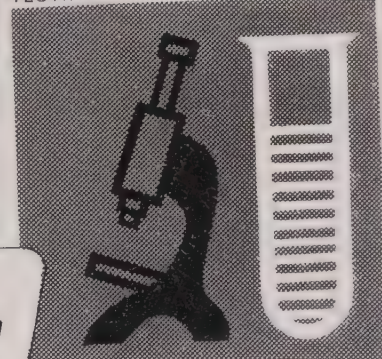
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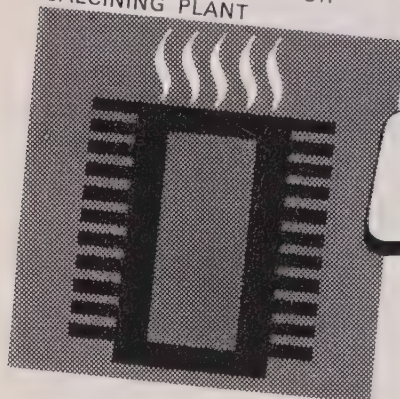
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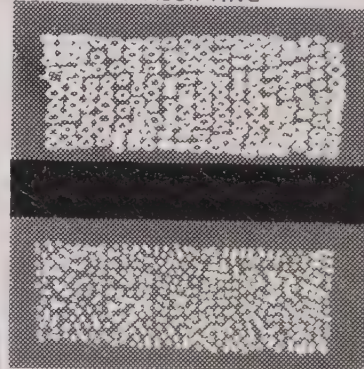
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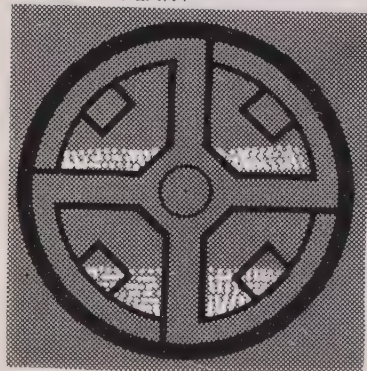
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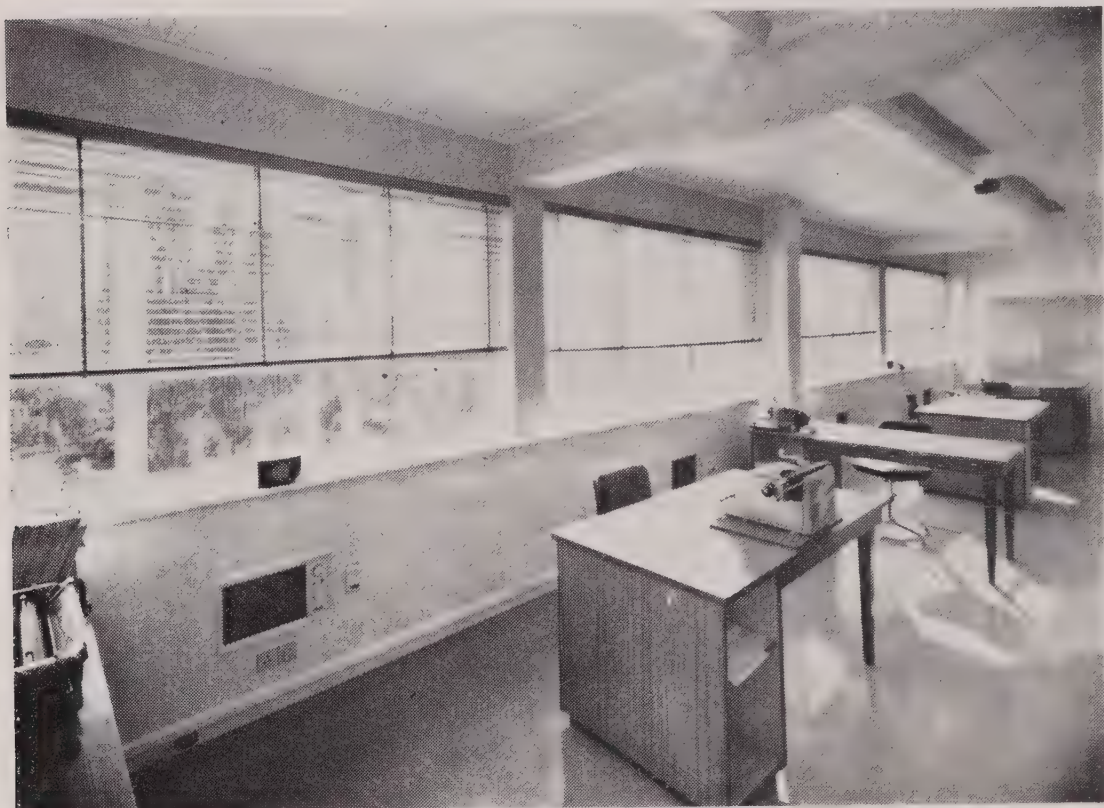
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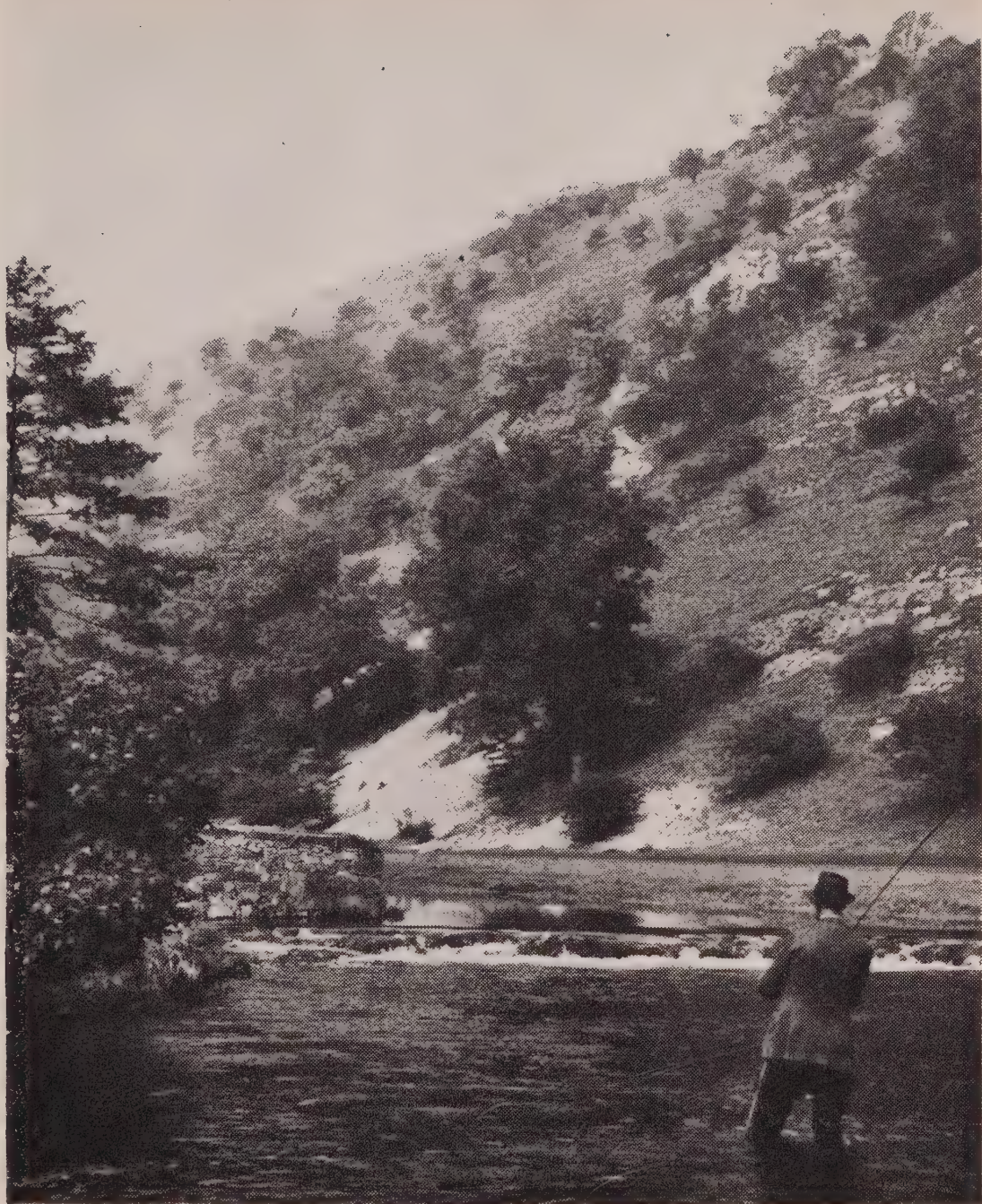
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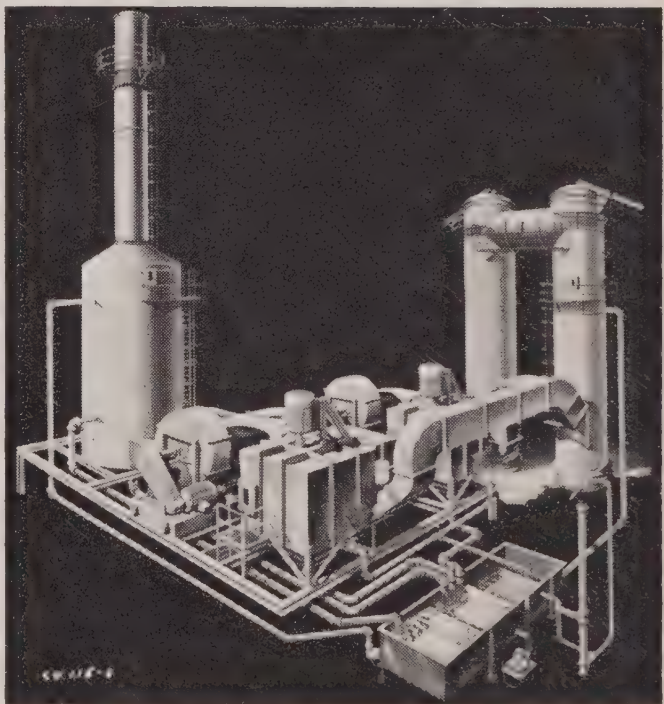
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# SMOKELESS AIR

Vol. XXXIX No. 150

Summer 1969

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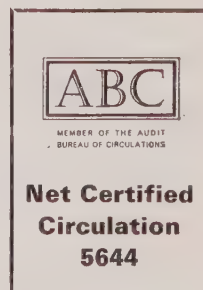
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*Ship, towers, domes, theatres and temples lie  
Open unto the fields, and to the sky:  
All bright and glittering in the smokeless air*

# SMOKELESS AIR

## The Annual General Meeting

The Society's Annual General Meeting was held at the Connaught Rooms in London on 25 April. This preceded the address by the Rt. Hon. Sir Derek Walker-Smith, Q.C., M.P. which is reproduced in full later in this issue.

The business of the meeting was quickly dealt with and the annual report and accounts were accepted. Sir Kenneth Hutchison, C.B.E., F.R.S. was elected President in succession to Sir John Charrington and a brief biography and photograph of Sir Kenneth appear on a later page. We welcome Sir Kenneth to the Society, but at the same time express our gratitude to our retiring President, Sir John Charrington, for all that he has done for us in his two years of office. A wise counsellor and an able administrator with unfailing courtesy and charm he has done much to benefit the Society and to further the cause of clean air. We are indeed grateful to him and are glad that, although no longer President, he is still a member of the Executive Council.

The election results for the divisional representatives to the Council show few changes. We should, however, pay tribute to those who have recently retired after rendering valuable services for a long time. They are Mr. E. M. Birtwisle of Horsforth, Mr. G. A. Hiller of Leicester and Dr. W. R. Martine, O.B.E., who for many years represented the British Medical Association and who was a former chairman of the Council. We thank them for their work in the Society and wish them well in the future.

## New Chairman of the Executive Council

At the first meeting of the "new" Executive Council, Dr. W. C. Turner, M.D., D.P.H., D.I.H. was elected Chairman in succession to Mr. A. C. Saword. A Londoner, Dr. Turner, who has been a Deputy Chairman for the past four years, has long had interests in clean air and the environment as a whole and is a Fellow of the Royal Meteorological Society. He attended his first Clean Air

Conference at Cardiff in 1938. Dr. Turner, who is Associate Medical Officer of Health of the London Borough of Tower Hamlets and who now represents the British Medical Association on the Council of the Society, has been engaged in public health in London for many years. He was formerly Medical Officer of Health at Poplar, and before that, was Deputy Medical Officer of Health at Chelsea and Kensington. We wish him well in his forthcoming two years of office.

We are grateful to Mr. Saword, Dr. Turner's predecessor, for all his work as Chairman during the past two years and as a Deputy Chairman in the previous four years. More than that, Mr. Saword was for many years Chairman of the Yorkshire Division, an office he has recently relinquished. But we are pleased that he will continue as a representative of the Yorkshire Division to the Executive Council.

## Solid Smokeless Fuel

In recent correspondence, Mr. K. Williams of Cheadle has on two occasions expressed the view that the continued use of solid smokeless fuels on domestic grates in smoke control areas is undesirable because they continue to emit smoke and sulphur dioxide at low level in sufficient quantities to be harmful. In support of this view, he quoted the highest daily concentrations of smoke and SO<sub>2</sub> during the winter of 1967-68. In fact, these figures confirm that much more must be done both domestically *and industrially* in the South Manchester region to achieve the quality of air desirable in urban areas.

We believe that solid smokeless fuel will continue to play an important part in maintaining clean air progress in this part of the country and we hope that no proposal for a smokeless zone will be turned down or postponed because of doubts about the supply position of solid smokeless fuels.

Mr. Williams does right to counsel vigilance regarding the smoke and SO<sub>2</sub> concentrations recorded in the winter months, but in quoting the highest daily concentrations in his district it should be pointed out that maximum concentrations of 400 microgrammes/cu. metre of smoke and 1,030 microgrammes/cu. metre of SO<sub>2</sub> were recorded in London—now a clean city—in the last report of the Scientific Adviser to the Greater London Council—the sulphur dioxide figure being nearly double the maximum amount recorded in February in Cheadle and Heald Green. For many years the National Coal Board has given full support to the Clean Air campaign in this country and it is surely a disservice to the efforts of the Board to suggest, by implication, that solid smokeless fuel alone is responsible for high daily averages of both smoke and sulphur dioxide when other carbonaceous fuels, high in sulphur content, are being used, both industrially and domestically, in areas where these figures are recorded.

## Emission of Smoke from Road Vehicles

A question was recently asked in the House regarding the number of prosecutions in 1968 for emission of black smoke from road vehicles. Mr. Elystan Morgan replied that provisional figures indicated that during the first nine months of 1968 there were 1,950 prosecutions in England and Wales for the unlawful emission of smoke and other harmful substances.





The Horse Guards— Before Cleaning (*Crown Copyright*)



The Horse Guards—After Cleaning (*Crown Copyright*)



## Cleaner Polar Bears

In recent issues we have reported that in London, because of cleaner air, there has been a return of the birds and where in the past only such shrubs as laurel and privet grew, flowers now bloom. It is now reported that the polar bears at the London Zoo are "whiter than white" compared with the colour of their fur ten years ago. Although this is partly attributable to the result of a cleansing fluid added to their bath, their new whiteness is also due to the big reduction in the quantity of dirt and smoke in the atmosphere.

Still on the subject of natural history, there has recently been a report that swifts have made substantial moves inwards in London since 1950—notably in Maida Vale, Regents Park, Notting Hill, and Kensington. The report adds that this spread of the swifts in London is probably due to reduction in smoke pollution.

## The Cost of Air Pollution

We learn that the average household in Connecticut is spending almost 600 dollars a year coping with air pollution and its effects on homes and household goods. This is an estimate of what it costs to paint the house, keep curtains, rugs and upholstery clean and pay laundry and cleaning bills for the family's clothing above the normal costs experienced in places where there is little air pollution.

This study of the costs of air pollution was sponsored by the Connecticut Department of Health. Twenty cities and towns were studied and although there was considerable variation in the average costs, the overall estimate quoted above is reckoned to be the true value.

## The Concorde

Those who live near an airport or close to its approaches are becoming increasingly concerned about the amount of pollution from modern jet aircraft. Not only can pollutants be smelled but they can also be seen in the form of dense black smoke; and although some experts argue that the dispersion is so great as to be harmless, those people who live underneath the approaches to an airport argue very strongly that some of the "dispersion" in the form of unburnt kerosene, falls on them and their houses. Although some studies to measure this pollution in the vicinity of airports have been carried out—notably in the U.S.A.—comparatively little is really known. But the picture of Concorde 002 taking off on its maiden flight was seen on television by millions and many were the unfavourable comments on the trails of black smoke it left behind it. Concorde is a new and wonderful aircraft as yet in its early trials stage. It is to be hoped, however, that as difficulties are overcome and trials continue that this emission of black smoke will be overcome also. In the meantime, it is to be hoped that investigations being carried out near London Airport will provide facts on which action can be taken either to allay unfounded apprehension or to impose procedures to reduce the emissions from aircraft.



# The Clean Air Year Book

The new Year Book for 1969-70 is published concurrently with this issue of *Smokeless Air*. It is larger than former issues of the Year Book; it contains more up-to-date information of which the section on Current Research in Air Pollution is a notable feature, and it has been given a more durable cover and binding. Because of these additions and improvements and because of increased production costs over which, we as a Society, have no control, it has been necessary to increase the price to 7s. 6d. Even so, this is a very reasonable price for such a handy reference book for all who are in any way concerned with air pollution and its control. It should be stated that this price of 7s. 6d. in no way reflects the amount of editorial work and time which goes into the collection, editing and presenting of the information; if the cost of this work was included, the price of the Year Book would be very much more than 7s. 6d.

We ask all members to ensure as wide a circulation as possible for this publication.

## Sunshine in London

A report published by the London Weather Centre "Weather", the journal of the Royal Meteorological Society states that the duration of bright sunshine at the London Weather Centre since 1958 has increased by about 50 per cent above the long term average from 1931 to 1960 during the months November to January. The report adds that this is probably associated with the decrease in smoke since the Clean Air Act came into force.

---

## Obituary

We regret to announce the death of Edgar Lunn, A.M.I.E.E., a pioneer in smoke abatement. When the Huddersfield Smoke Abatement Council was formed in 1928 he became its first secretary. The following year, largely through the efforts of the newly formed Council, a Bye-law was adopted to prevent the emission of black smoke. Infringement carried the penalty of a £50 fine. By the end of the year it was possible to announce a great improvement in the atmosphere as well as the establishment of a lecture course on Boiler-House Practice at the Technical College.

Mr. Lunn kept a book of press cuttings from 1932 until 1936 which constitutes an important contribution to the history of smoke control during this period.

---

# Clean Air in a Changing World

Address to the Society's Annual Open Meeting in London  
on 25 April 1969 by

*The Rt. Hon. Sir Derek Walker-Smith, Q.C., M.P.*

It is a great pleasure for me to be invited to give this talk to the Annual Open Meeting of the National Society for Clean Air. I have a long interest in the subject matter. In the context of personal health I was of course much concerned with it in my days as Minister of Health; but my general interest dates back a good deal further. Indeed it is in a sense a hereditary interest since my father was at various stages of his career concerned with questions of environmental health. For myself, I have been for nearly quarter of a century Vice-President of the Association of Public Health Inspectors, which shows that they add tolerance to their well-known virtues of informed assiduity in the many spheres of environmental health with which they are concerned.

Air pollution, like noise, is one of the inherent and inescapable problems of an industrial society. They are, if uncorrected, the price that has to be paid for the benefits that accompany expanding population, greater comfort, and a heightened demand for the products and perquisites of a sophisticated economy.

In such conditions—in the conditions, for example, of the England of the Industrial Revolution and after, in the conditions of a crowded, bustling, toiling community—clean air, like quiet, becomes not the natural gift of Nature but a prize requiring to be won, and to be won only by determined effort, by the operation of law and the application of ingenuity.

At this stage, our two examples perhaps part company because, though the problems are similar, the progress is disparate. And the rate of progress is considerably in favour of the control of air pollution as opposed to the containment of noise. In the realm of noise, the challenge is mainly to be met; in that of air pollution the challenge has been accepted, and very significant progress has been achieved.

In the realm of noise, abatement has not so far succeeded in advancing materially beyond the concepts of Common Law nuisance. In the realm of air pollution we have now a strong statutory framework, which Parliament is not slow to strengthen and fortify as we saw as recently as last Session in the passage of the Clean Air Act, 1968.



One reason for the difference is no doubt that the effects of air pollution are more readily identifiable and easier to assess. The effects of noise, disagreeable as they are, lie mainly in the psycho-somatic context, and they vary subjectively with the recipients.

The effects of air pollution—or, at any rate, some manifestations of it—are distressingly and evidently physical. They are readily apparent and can be measured in terms not only of the dust and grit produced, not only in terms of hygiene but of health. They can be measured unfortunately in terms of morbidity and even—as we saw in the affliction of smog—in terms of mortality.

Even in more normal terms, the importance in the context of health, of the control, diminution and, so far as possible, the elimination, of air pollution is obviously very great. After all, Britain must be one of the most bronchitic countries in the world. Bronchitis is sometimes known in other countries as the “English disease”. Certainly its incidence is very high, and causes not only great personal inconvenience and distress but substantial industrial loss through incapacity for work. Of course, air pollution is only one cause. Our climate bears a heavy share of responsibility. But we can’t control that. Air pollution, however, we can and do control.

Nevertheless the real advances in this field are recent. The problem, as I have said, is mainly one advancing in the wake of the Industrial Revolution. In respect of the emission from factory chimneys and furnaces this is obviously so. But it is also substantially so in respect of domestic smoke because, though of course people were emitting smoke from their open fires, the numbers were comparatively few and the houses not closely concentrated—and, of course, not so very much earlier the fuel was wood.

But the pollution brought by the Industrial Revolution and its attendant problems had a longish run before anything effective was done about them. The transformation from the old English rural scene can be gauged in contemporary accounts, from which I may perhaps be allowed to cite a few lines from one of the great masters of English descriptive prose.

“The straggling cottages by the road-side, the dingy hue of every object visible, the murky atmosphere, the paths of cinders and brick-dust, the deep-red glow of furnace fires in the distance, the volumes of dense smoke issuing heavily forth from high toppling chimneys, blackening and obscuring everything around; the glare of distant lights, the ponderous waggons which toiled along the road, laden with clashing rods of iron, or piled with heavy goods—all betokened their rapid approach to the great working town of Birmingham.”

(The Pickwick Papers: Charles Dickens)

Perhaps it was not surprising that remedy lagged behind contamination. After all, it was an era of *laissez-faire*. England’s industrial supremacy was built on coal, and there was a perhaps natural reluctance to curb or control its utilization. And so far as domestic smoke was concerned, in the absence of smokeless fuels, there was a clear limit to the degree of control which could be reasonably or viably imposed.

When control did come it came in two forms. The control of industrial emission by way of noxious and offensive gases proceeded then as now under the Alkali legislation, the first Alkali Act reaching the statute book in the 1860s—a control based on expert inspection and enforcement.

In regard to the control of smoke, the law approached the matter on predictable lines, by way of an extension of the law of nuisance. Even at political economy's most laissez-faire period, English law never retreated from the principle "*sic utere tuo ut alienum non laedas*"; and it was natural to base control on an application of this principle by way of the prescription of statutory nuisance, arising from smoke pollution.

This is what was done in the great Public Health Act 1875, and its provisions are still law today, now to be found in Sections 101-106 of the consolidation Public Health Act, 1936. It is, however, noticeable what a very small proportion of Public Health legislation this constitutes—six Sections out of 347 in the Act.

But perhaps more significant is the fact Section 101(a) had to exempt existing domestic chimneys from the classification of smoke nuisances. The control of domestic smoke under the Act was confined to its impact on new buildings by way of building bye-laws for regulating the emission of smoke.

But, of course, the great step forward came with the Clean Air Act, 1956, and its prescription of Smoke Control Areas within which the emission from any building, whether industrial or domestic, became an offence. The policy initiative incorporated in this Act has met with gratifying success.

In fact, it has been reported that the amount of smoke emitted had fallen by 1967 to about 40 per cent of that in 1954. This is a continuing trend and in the years ahead our air should become still cleaner. Indeed it has been forecast that by 1975 smoke should be only one quarter of that emitted in 1954. This improvement is undoubtedly due to the application of the provisions of the Clean Air Act, 1956.

This great improvement has been mainly in the sphere of control of domestic smoke. Of course, the control of industrial pollution is the more technical and complex aspect of Clean Air. It calls for the special expertise and skilled attention of the Alkali inspectorate of the Ministry of Housing and Local Government, backed up by the work of Local Authorities and their Public Health Inspectors.

But, of course, in scale and volume, domestic smoke is still much the biggest contributor—perhaps three-quarters of the whole. And its control is primarily an administrative matter, not presenting the same degree of technical complications.

I would say that the main requisites for effective Clean Air action are probably three. First, of course, there is the will to take action, because nothing is ever accomplished without defined intention and clear resolve. This will, I think, clearly exists—much more manifestly than in the case of noise, for example, which is no doubt a considerable factor in the much more satisfactory rate of progress.

Secondly, there must be a principle on which control can operate. This is basically still the principle of "*sic utere tuo . . .*" but translated into action not only by the prescription of statutory nuisances but by the more direct and positive prescription of smoke control areas—or smokeless zones as they are popularly known.





The A.G.M.—Sir Derek Walker-Smith addresses the Open Meeting

Thirdly, of course, is the question of means. In the case of industrial pollution, this involves the technical expertise to which I have referred. But it may also involve some economic sacrifice, in that the most efficient or profitable method of production may in some cases involve pollution. This sacrifice is not, however, necessarily quixotic, or unrequited, having regard overall to the loss of industrial output imposed by bronchitis and respiratory afflictions, which can be caused or aggravated by air pollution.

In the context of domestic smoke the prime requisite in respect of means is, of course, the availability of alternative means of smokeless heating.

Last year Lord Kennet ascribed the improvement partly to changes in social custom.

“The improvement in the atmosphere of this country is due partly to changes in social habit and taste which would perhaps have happened anyway without a Clean Air Act. The passing of the domestic servant has influenced the upper and middle classes to abandon coal fires and coal-fired boilers, and turn to cleaner and more convenient methods of heating.”

Of course, some people—in what seems another age—used not only to rely on domestic servants to lay and light the fires, but used to ring for them to put more coal on the fire. Though this had its complications too as we see from the account of the “swarry” of the select company of the footmen of Bath where



Mr. Whiffen confessed that “on an occasion of sudden sickness in the house”, he had “so far forgotten himself as to carry a coal scuttle up to the second floor”—a circumstance greatly deplored and keenly deprecated by his fellow footmen.

*Autres temps, autres mœurs.* There are now neither footmen nor fires, and pace Mr. Whiffen, Lord Kennet may be right in ascribing the disappearance of the latter in some measure to the passing of the former.

But it could not be the primary cause. The primary cause lies in the availability of smokeless alternatives, and the opportunity which this offers to insist on their use in preference to the traditional and—from the point of view of the citizen at his own fireside—attractive and comforting open coal fire.

Certainly one of the greatest revolutions which has taken place as a result of the Clean Air Act has been the changes in domestic heating. Until 1956 the traditional and most widely used method of heating our houses was the inefficient and, functionally speaking, highly unsatisfactory open coal fire. With the advent of the Clean Air Act this was widely supplanted by the improved open fire burning gas coke.

But then new methods of making gas were introduced and supplies of gas coke fell and with the introduction of natural gas they will fall still further. This has caused some complications in clean air work but the Solid Smokeless Fuels Federation have recently given an assurance that the other producers of solid smokeless fuels have increased their production to such an extent that there should be no major problem with regard to the availability of these fuels.

Now, however, it seems that we may turn full-cycle because having forced householders in smoke control areas to give up burning coal, we now learn that the National Coal Board have produced a new device suitable for domestic use which they claim will burn coal smokelessly. Indeed they have satisfied the Minister of Housing that it will do what they claim. It is certain that those concerned with the control of air pollution will view the appliance at any rate initially, with healthy scepticism and will need a lot of convincing that this is not a retrograde step.

It will, in any event, complicate the task of those whose duty it is to enforce provisions of the new Clean Air Act, 1968, which are designed to prevent the delivery of coal to householders not permitted to use it; and may no doubt lead to some amendment of that Act—incidentally in itself a good example of the usefulness, within relatively modest limits, of Private Members’ legislation.

As to the future, big and fundamental questions suggest themselves. For example, ought we not to be able to look forward to the time when the delivery of solid fuel to individual dwellings will be a thing of the past? Is there not a big future for district heating schemes with our heating requirements and hot water piped into our houses? Coal can be burned far more efficiently in large boilers and with little smoke than so far it has been possible in small domestic appliances. Is not this the way we should go? Others know much better than I the technical considerations involved, but it seems in principle to be a proper pattern of advance.



Of course, in any event, the problems of environment need to be dealt with comprehensively and in a co-ordinated manner.

For example, the control of air pollution has made an impact on public cleansing. With the disappearance of the open fire the opportunity for burning combustible rubbish is lost and more and more paper and cardboard is put in the dustbin. When domestic heating is switched to gas and electricity there are no cinders or ashes to be disposed of. As a result, refuse has become lighter and more bulky and this is bringing about changes in collection and disposal methods. This process could be accelerated by the more rapid introduction of district heating.

Can we also not look still further ahead to the time when most of the refuse we have to get rid of will go via sink grinders to the sewers. We have a water carriage system for sewage, but we are still at the "privy" stage with domestic refuse.

A further example of the inter-relationship of the various aspects of environmental health work is the need to link smoke control and the improvement of houses. The Government's Housing Bill is now being considered in Committee in the House of Commons and one of the most important objectives it will seek to achieve is a great increase in the numbers of houses improved to modern standards. Grants are to be made to local authorities to improve the environment in general improvement areas. The idea, which is perfectly sound, is that it is not enough merely to put modern amenities into the houses—the whole area should be given a face-lift. Quite clearly when an improvement area is declared it should also be made a smoke control area if that has not already been done.

May I finally and respectfully commend the decision of the National Society for Clean Air to recognize and honour outstanding contributions to the cause of clean air. The Society has announced that starting in 1970 it will make clean air awards to individuals, industry and local authorities. They will take, I understand, the form of medals to all three classes, a plaque of the emblem of the Society for local authorities and a suitable emblem for use by industry on stationery. The first awards are to be made in October, 1970, and are to cover achievements in the 15 years from 1 January, 1955, to 31 December, 1969.

It is particularly appropriate that these awards should be inaugurated in 1970 for 1970 is to be European Conservation Year. This is being organized by the Council of Europe and is designed to impress upon member countries the need to maintain and improve Europe's natural resources in landscape, air, soil, water and wildlife—for man's greater benefit and enjoyment. In the realm of practical and pollution control, however, the United Kingdom compares very favourably with any other European country. Indeed, it is not too immodest to claim in many respects we are far ahead of most of Europe. It is fitting, therefore, that there should be public recognition of the valuable contributions made by many individuals and bodies to the clean air movement.

I think, generally speaking, we can claim good progress in this important field. I say "we", though I can claim very little credit personally, save as a humble member of the Legislature. But the Society is entitled to much credit as a body which has helped to formulate public opinion and promote beneficent action.

The progress has been good, and the gains have been great. Have there been no losses? I think perhaps there have. I referred to open coal fires as being functionally unsatisfactory. But they brought great pleasure to those who sat around their ruddy glow, bravely defying the winter cold.

Let me just remind you—again in the words of that same master of descriptive prose—how pleasant it could be. He is describing Mr. Stiggins taking his ease in the Marquis of Granby at Dorking, run by Sam Weller's step-mother.

“To do the red-nosed man justice, he would have been very far from wise if he had entertained any such intention; for, to judge from all appearances, he must have been possessed of a most desirable circle of acquaintance, if he could have reasonably expected to be more comfortable anywhere else. The fire was blazing brightly under the influence of the bellows, and the kettle was singing gaily under the influence of both. A small tray of tea-things was arranged on the table, a plate of hot buttered toast was gently simmering before the fire, and the red-nosed man himself was busily engaged in converting a large slice of bread into the same agreeable edible, through the instrumentality of a long brass toasting fork. Beside him stood a glass of reeking hot pineapple rum and water, with a slice of lemon in it; and every time the red-nosed man stopped to bring the round of toast to his eye, with the view of ascertaining how it got on, he imbibed a drop or two of the hot pineapple rum and water and smiled upon the rather stout lady, as she blew the fire.”

Such cosy scenes have yielded place. Progress has given the open fire its congé, and soon there will be few to remember them. But in this imperfect world, there is always a price to pay. At least in this case, we can reasonably hope we are not paying for nothing. The price is paid, but the prize of Clean Air is within our grasp.

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## EXHIBITION ACTIVITIES

The Society in addition to its own exhibition at Eastbourne will also have stands at the South West District Heating Conference and Exhibition to be held in Bristol from 16-19 September, and at the Dust Control and Air Cleaning Equipment Exhibition at Olympia 23-26 September, 1969.

### **International Clean Air Congress and Exhibition, Dusseldorf 13-17 October, 1969**

The British Joint Venture Stand at this exhibition which is being organized by the Society in conjunction with the Board of Trade, will have some 18 companies taking part, and will occupy some 4,000 sq. ft. of floor space. It will be the largest national exhibit in the show.





# CLEAN AIR

# HIGH SPEED GAS



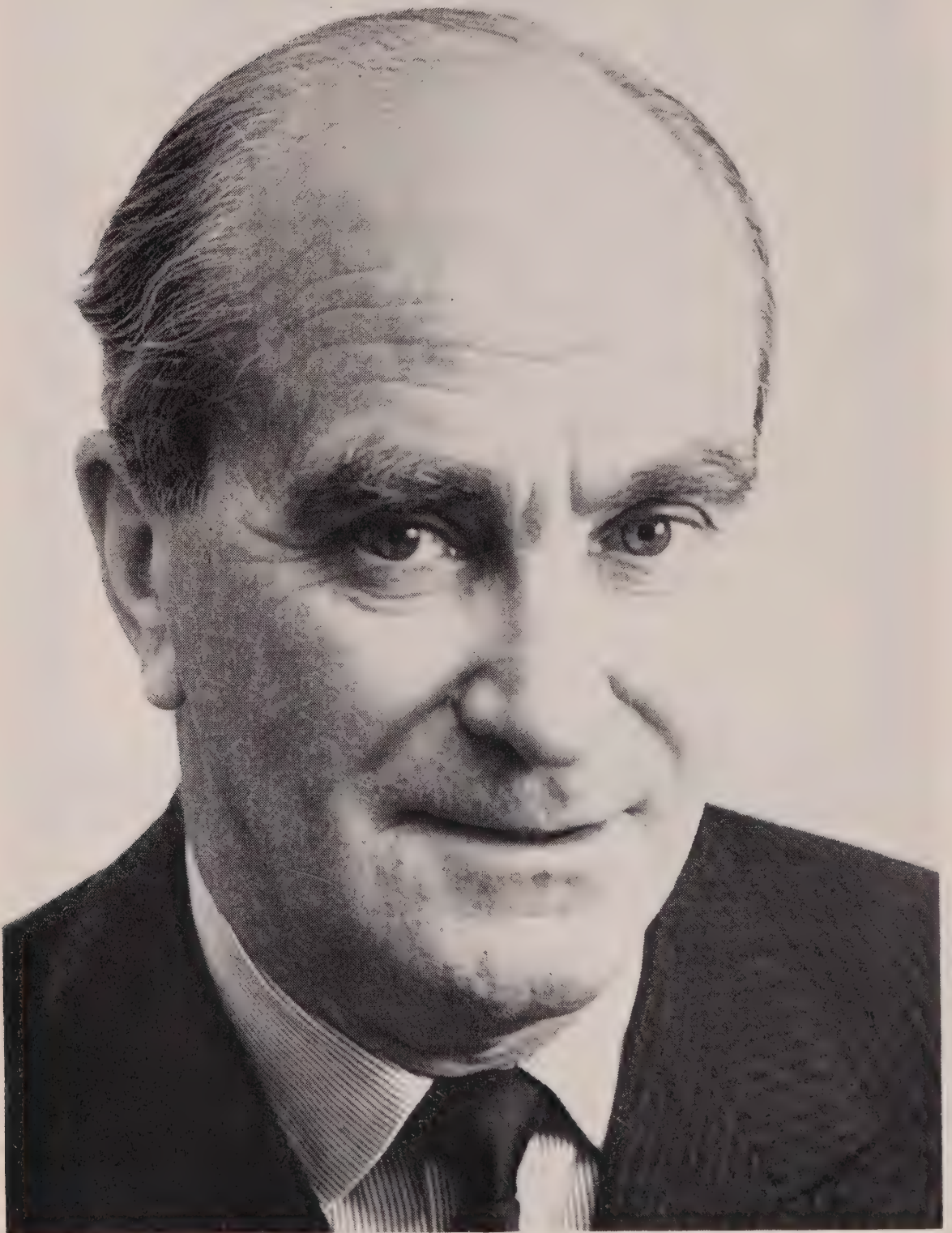
High Speed Gas contributes towards a cleaner society because its combustion is clean and complete and does not infringe Clean Air legislation. Use gas for heating, hot water, catering, air conditioning and incineration.

Count the cost in terms of the plus factors of gas, like clean combustion, ease of operation, low maintenance,

no delivery, handling or storage problems. Remember, gas is an economical fuel and as North Sea Gas pipelines span the Country, tariffs will become even more favourable.

Gas is the great all-round fuel for a healthy Britain in home, commerce and industry. Check the facts with your Area Gas Board.

## **The Society's New President**



Sir Kenneth Hutchison, C.B.E., F.R.S.



Sir Kenneth Hutchison, C.B.E., F.R.S., was elected President of the Society at the Annual General Meeting on Friday 25 April, to succeed Sir John Charrington, who has held this office for the past two years.

Engaged on important research work in the gas industry since 1926, after nationalization, Sir Kenneth Hutchison was appointed Chairman of the South Eastern Gas Board where he pioneered the use of gas for central heating and was concerned with developing the commercial application of the transport of liquified natural gas. In 1960, Sir Kenneth became Deputy Chairman of the Gas Council and during the next six years saw the construction of the first national gas grid, based on gas imported from Algeria, and the successful search for large reserves of natural gas in the North Sea.

Since his retirement from the Gas Council in January 1967, Sir Kenneth has been Chairman of the International Management and Engineering Group Ltd., a Director of Newton Chambers & Co. Ltd., and an adviser to the American International Oil Company.

Sir Kenneth was awarded the C.B.E. in 1954 and was knighted in 1962. In 1966, he was elected a Fellow of the Royal Society.

He is a past President of the Institution of Chemical Engineers, the Institution of Gas Engineers, the Society of British Gas Industries and of the British Road Tar Association. He was at one time a member of the Clean Air Council, of the Minister of Power's Advisory Council on Research and Development and of the Committee on Coal Derivatives, also set up by the Minister of Power.

His many publications include papers in the Proceedings of the Royal Society and other journals from 1925 onwards. He holds two medals awarded for technical papers; in May 1966, he was awarded the Birmingham Medal by the Institution of Gas Engineers.

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## **Symposium on Corrosion**

The Institution of Corrosion Technology announces that it will hold a "Mini-Symposia" at 14.00 on 28 October, 1969 at 33 Ovington Square, London, S.W.3. The title is "Anti-Corrosion Performance of Non-Ferrous Metals". Further details of the Symposium may be obtained from the Secretary, The Institution of Corrosion Technology, 33 Ovington Square, London, S.W.3.

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# Eastbourne Conference and Exhibition

The programme for the 1969 Conference which opens at Eastbourne on Tuesday 21 October has now been completed and is given in detail below.

The opening address at the Tuesday morning session will be given by Mr. J. P. W. Mallalieu, M.P., Minister of State, the Ministry of Technology, and this will be followed by the first Presidential Address of Sir Kenneth Hutchison, C.B.E., F.R.S. The Tuesday afternoon session is something of an innovation; it will take the form of an Open Session for all delegates and their wives and members of the public drawn from schools, organizations, associations and the like in the Eastbourne and West Sussex area. The address will be given by the Baroness Serota, J.P. Minister of State (Health) of the Department of Health and Social Security. After the session there will be a specially conducted tour of the Exhibition for the members of the public present followed by tea by courtesy of Shell Mex and B.P. Ltd.

Technical visits on the Wednesday afternoon to the B.P. Oil Refinery on the Isle of Grain, the Rodmell Cement Works at Lewes, to Crawley New Town, and the Reed Paper Mills at Maidstone have been arranged. It is also hoped that it will be possible to include in the programme a visit to the Central Electricity Generating Board's Nuclear Power Station at Dungeness.

A programme of visits for the ladies to places of interest around Eastbourne is in course of preparation, and full details will be announced later.

The informal gathering usually held on the Monday evening immediately before Conference, will this year take the form of a reception or soirée at which Esso Petroleum Ltd. will be the hosts. The Solid Smokeless Fuels Federation Golf Tournament will be held at Willingdon on the Wednesday afternoon.

An interesting series of papers will be presented at the Conference proper, and it is confidently expected and hoped that these, sometimes controversial, subjects will stimulate informed and interesting discussion.

The Conference registration fee this year is eight guineas for nominated delegates. A special concession fee of four guineas will be charged for individual members.

The scheme, started last year, for those persons who were able to attend only one session or the two sessions in the one day, and which made such a successful impact, will be continued. The special "day registration" fee will be two guineas which does not include the printed papers.



# The Programme

## Monday 20 October

20.30 Evening Reception at Floral Hall

## Tuesday 21 October

10.30 Opening Session  
Civic Welcome by the Mayor of Eastbourne.  
Opening Address by Mr. J. P. W. Mallalieu, M.P., Minister of State, Ministry of Technology.  
Presidential Address by Sir Kenneth Hutchison, C.B.E., F.R.S.  
Formal Opening of the Exhibition by Mr. Mallalieu.

14.30 Open Session "A Clean Air Environment for the Future".  
Speaker, the Baroness Serota, J.P.

## Wednesday 22 October

10.00 Session 3  
"Outstanding Pollution Problems in the Ceramic Industry"  
by Mr. E. Rowden of the National Federation of Clay Industries  
and Mr. W. H. Holmes of the British Ceramic Research  
Association.

Afternoon Technical visits and S.S.F.F. Golf Tournament.

Evening

20.30 Civic Concert in Congress Theatre by courtesy of the Mayor and Corporation of Eastbourne.

## Thursday 23 October

10.00 Session 4  
"Air Pollution Control in Oil Refining" by Mr. P. Sutton of  
Esso Petroleum Ltd.  
"Sulphur Oxides and Oil Fuels" by Mr. H. I. Fuller of Esso  
Petroleum Ltd.

14.30 Session 5  
"Medical Aspects of Air Pollution" by Professor P. J. Lawther.

## Friday 24 October

10.00 Closing Session  
"Cement Works: Problems in the Industry" by Mr. E. Burke,  
Director of Research, Associated Portland Cement Manufacturers Ltd.  
"Iron and Steel: Progress towards Clean Air" (two papers) by  
Mr. P. A. Matthews and Mr. J. H. Flux of the British Steel  
Corporation.

12.00 Close of Conference

# The Exhibition

Several companies will be exhibiting this year for the first time at the Clean Air Exhibition. With new and interesting equipment on show it promises to be something well worth visiting.

# Pollution from Road Vehicles

## Members of the Society's Technical Committee meet Officials from the Ministry of Transport

A special meeting of the Technical Committee at which members of the Committee met representatives of the Ministry of Transport, to discuss the differences of approach regarding pollution from road vehicles, was held in the Society's offices on 25 March last. An agreed agenda outlining the differences of viewpoint was used, and discussion took place first on diesel engined vehicles and second on petrol engined vehicles.

The main point of the discussion regarding diesel engined vehicles was whether the British Standards Institution Specification (B.S.A.141) was tight enough. The Ministry of Transport officials said that when the specification was established, it had been hoped to set it more tightly, but some of the manufacturers of diesel engines could not at that time reach the necessary level. A compromise had, therefore, been arrived at. It seemed probable that the standard would be reviewed after it had been in force for a period of some three to five years. The Ministry agreed that old vehicles did constitute a problem, but the new annual check instituted by the Ministry should help to obviate nuisance from this source.

The British Standard's Specification is not legally enforceable at this time and the Ministry admitted that certain engines did not reach the required standard. Consultations regarding the standards to be set for diesel engined vehicles were going on within the Economic Council for Europe, and the United Kingdom were seeking an equivalent of B.S.A.141. Generally, however, most Continental countries were asking for a less restricted limit.

The main point of the discussion on petrol engined vehicles was what the cost would be to modify cars to reduce the emission of carbon monoxide to an acceptable level, using the latest technical advances. The Ministry's objection at the moment was that even if it only cost £10 per car, this would cost the country a lot of money. Whereas the Society contended that to ask the motorist to pay 1 per cent extra for his new car was very little. The Ministry maintained the attitude that so long as it could not be proved that the emissions from petrol engined vehicles constituted a hazard to health, there was no necessity to introduce legislation. However, it was conceded that any medical evidence which the Society could procure would be most helpful to the Ministry and would strengthen the case for bringing in legislation.

It may seem from the above that little progress was made. However, the very fact of a meeting round the table where differences could be freely discussed was a considerable step forward, especially when it is remembered that it was not members of the Society who called on the Ministry, but it was the representatives of the Ministry who paid the Society the courtesy of coming to our offices.



# Clean Air in the Design for Living

Visitors to the London Borough of Hammersmith unique Design For Living permanent Health Education Exhibition at 2-6 Fulham Broadway, S.W.6, are presented with an impressive visual aid to fasten attention on the significance of Clean Air in their daily lives.

As the photograph on page 294 shows, the National Society for Clean Air exhibit attractively presents the facts about: Clean Air and Health, the Home, Industry, the vehicle, and the Future. In the foreground a simple open bench sampler, provided by Glass Developments Ltd., measures impurities in the air within the main exhibition hall, and the accompanying filters on display constantly surprise audiences unaware of the air pollution even in a Clean Air Zone. It is emphasized that the sampler on show is a simple demonstration model but that the Borough research instruments in use are of the automatic 8 Port type. On the base surrounding the model is found current National Society literature, including Notes for Teachers and Lecturers. This Clean Air display appropriately serves as an introduction to the environmental section of the exhibition.

Opened in 1966 by the then Minister of Health, Mr. Kenneth Robinson, M.P., the Design For Living Exhibition tells the story of life from cradle to the advancing years, and utilizes all the latest audio-visual aids and display media. Open to the public, the exhibition in fact has attracted the regular attendance of a very wide range of interests—school groups (from 10+), polytechnics, colleges of further education, including trainee teachers, graduate students, nurses, health visitors, nursery nurses, social workers, public health students, indeed representatives of all the health and community services. As the exhibition includes programmed learning, a film and demonstration theatre, and features all the Borough health education campaigns throughout the year, it is true to say that while the theme remains constant the content is frequently varied to ensure up-to-date information is available at all times.

With each major campaign or “reminder”, invitations are sent to all appropriate organizations—national, regional and local—so not surprisingly average attendance is 500 per week and in a special campaign as many as 8,000 visitors attend in a month. Teachers have fully co-operated in organization of project work and it is worthy of note that after most group visits there is a return by many individuals for private studies or to introduce friends to the exhibition content. Several schools use the Design For Living as an examination centre in the Duke of Edinburgh Award Scheme. Close liaison is maintained with Ministries and Departments at home and overseas and the work of the exhibition has been illustrated in America, Australia, New Zealand, India and Sweden to name but a few countries. Some 240 organizations and companies are represented at the Design For Living Exhibition and there is now a waiting list for display content. Quite apart from “on the spot” information there is a large range of free literature, posters, etc., available to enquirers.





N.S.C.A. Display Unit on show at "Design for Living" Exhibition in Hammersmith. The unit has been on permanent free loan for three years and is an example of the service which the Society provides for local authority members

Latest innovation is inclusion of a series of programmed learning machines for study purposes, together with a headphone system for tour and study purposes which leaves the user free to move around three display halls. The Borough Health Education Service uses the exhibition as a focal point but in addition supplies health and welfare centres, youth clubs, schools as well as organizations with campaign information—and considerable attention is paid to appraisal, evaluation and research procedures in the cause of Health Education. As would be expected, not only is there appropriate emphasis on Clean



Air, but stress also on anti-smoking, cancer, noise abatement, environmental health hazards, and challenges all who would subscribe to Good Health—and Safer Living.

Open from Mondays to Fridays, 10 a.m.-5 p.m., there is no admission charge, but children must be accompanied. For interested societies it is possible to arrange visits with conducted tour and film show or demonstrations on days and times convenient to the groups, but in all cases it is essential to book well in advance (telephone 01-385 1212, extension 320). As the exhibition is only a few yards across the road from Fulham Broadway District Line station and is also served by Bus Routes Nos. 14, 28, 11 and 91, there is no difficulty in travel.

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## Clean Air Congress and Exhibition Dusseldorf, 13-17 October, 1969

The Joint Venture Stand being organized by the Society will occupy a prominent position in the enlarged Hall B of the Messegelände at Dusseldorf. The stand will be of the open plan type and an important feature will be the information/lounge area which the Society, as organizers, will staff. A mural display will tell the story of the long campaign to achieve clean air in Britain and also emphasize that much remains to be done, particularly as regard road vehicle emissions and the amenity aspects of air pollution.

A brochure, in colour, for general distribution is being produced for the stand to serve as a general guide to the exhibits for visitors to the exhibition. In addition to companies listed in the Spring issue of *Smokeless Air*, Centri Spray Ltd., and Polar Chemicals Ltd., have joined the venture.

Copies of the Congress programme can be obtained on application to Field House.

A few sites on the stand are still vacant and early inquiry to the Society is urged from companies wishing to take advantage of the free space made available by the Board of Trade.

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# NEW EXHIBITION STAND



Modular Units of the Society's new display stand

The Society have ordered a new exhibition stand for use at Eastbourne and at other exhibitions in which the Society is participating.

It is completely portable and complete with its own flooring and lighting. Composed of a number of modular units it is simple to erect and dismantle. Stands ranging up to 300 sq. ft. can be built in a variety of designs, and smaller display units can be arranged if required.



The display illustrated is only one example of the many variations possible, and is typical of the type of unit suitable for use by local authorities and corporate members. These units will be available on loan from 1 November, 1969. A heavy demand is expected for the loan of these displays and early application for them is essential.

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## REVIEWS

### **B.C.U.R.A. Annual Report 1968**

The B.C.U.R.A. change in status which was recently announced is emphasized in this report. After a transitional period during 1969 and 1970, the National Coal Board will run B.C.U.R.A. as a wholly owned subsidiary company. B.C.U.R.A. will carry out not only research for the Coal Board but will also undertake sponsored research for any industry, and in future will be known as B.C.U.R.A. Industrial Laboratories.

During 1968 the report outlines the wide range in scope of B.C.U.R.A. activities. Very great emphasis has been given to the fluid-bed combustion of coal. A prototype fluid-bed shell boiler with a steam output of 3,650 kg/h. has been designed and delivery is expected early this year. This boiler will be about half the size of the conventional boiler of the same output, and production models of the boiler should be significantly cheaper. A further development has been the construction of a pressurized fluid-bed combustor to determine whether combustion gases can be made suitable for driving the gas-turbine component of a combined-cycle power-generation plant. If this venture is successful, this could lead to the development of power station boilers of a very much smaller size than those at present used.

B.C.U.R.A. is taking an interest in the combustion of rubbish on an industrial scale and is now prepared to undertake contract work on incineration. Instruments developed for on-line measurements of pulverized-coal feeds have been developed and it appears that these have potential application to airborne solids in general. Considerable attention has been given to the possibility of manufacturing from coal such products as binders and grists for graphite artefacts, carbon fibres and plastics. This work has a dual objective; new industrial outlets for coal on the one hand, and savings in imported feedstocks for making carbonaceous products on the other. In the field, a small team specializing in boiler and pollution problems has been set-up to carry out on site testing of industrial plant on repayment terms. Similarly, computer and analytical services have been made available to outside firms and organizations.

The report announces an entirely new scheme by which any firm can become an associate member of B.C.U.R.A. and for a payment of a basic fee be kept informed of all non-contract activities and have a right of call upon a comprehensive range of information and consultation services.

The report is freely available on application to the Publications Distribution Office, B.C.U.R.A. Industrial Laboratories, Leatherhead, Surrey.

## **Urban Air Pollution with particular reference to Motor Vehicles**

*The report of a W.H.O. expert committee. W.H.O. Technical Report Series No. 410, 53 pages, H.M.S.O., 6s.*

Before going on to consider pollution from motor vehicles in rather greater detail, this report, drawn up by an expert committee, reviews the progress in air pollution control over the past 20 years. The report, although acknowledging that there is still much to be done all over the world to reduce smoke and dust from the combustion of fossil fuels rather gives the impression that the control of these well-known pollutants has largely been achieved. The report goes on, however, that more tension should be paid to the control of sulphur dioxide emissions, and points out that not only has the concentration of sulphur dioxide not been reduced very much, but in some instances has actually increased during the past ten years.

That part of the report concerned with the emissions from road vehicles considers in detail the way in which pollution from this source is increasing significantly and surveys the trends in pollution in various countries.

The legislation enacted to control emissions from road vehicles in various countries is discussed and comparisons are made between the legislation in the United Kingdom and that of the United States of America.

The nature and composition of pollutants from the exhaust, crank case, carburettor and fuel tank of petrol engined vehicles are discussed at length. These are compared with the emissions from diesel engined vehicles. The text is fully supported by ample figures.

The report then considers methods of sampling and analysis and goes on to consider the effects of vehicle exhaust products on health. Here a distinction is made between exposure to primary pollution, which may be relatively brief, and exposure to secondary pollution, which is more prolonged, and points out that vehicle exhaust products should not be considered in isolation since they are usually one of many sources of urban pollution. The effects on man of concentrations of carbon monoxide exceeding 20 per cent saturation, range from headache and dizziness to coma and death, the report states, and adds that such levels do not result from the exposure to concentrations found in town air. The report continues that there is no undisputed evidence that blood carboxyhaemoglobin concentrations of between 3 and 4 per cent, such as may result from exposures to traffic exhaust fumes, exert psychomotor effects. But this lack of evidence does not necessarily mean that such concentrations are harmless.

The effects of pollution from road vehicles on the environment are then considered and the report continues with a review of methods of control and an evaluation of their efficiency. Methods for bringing vehicle pollution under control are subdivided into four broad categories: (1) application of control devices or techniques to vehicles; (2) administrative procedures to ensure the least expensive solutions for pollution reduction; (3) environmental health surveillance programmes to evaluate the effectiveness of emission regulations; and (4) application of urban planning to ensure the widest possible dispersal of residual pollution emitted by cars with controls. These categories of control are then discussed in the context of developments in the United States of America.



The report concludes that more attention should be given to the establishment of a world wide collaborative study of air pollution in urban areas, using comparable techniques and reporting methods and including meteorological observation. So far as pollution from road vehicles is concerned, the report concludes that further data are needed on carboxyhaemoglobin levels and other biochemical indices in persons exposed to pollution from traffic. "Surveys to obtain such data should supplement those now being made of levels of pollutants in the air. The effects of carbon monoxide concentrations that result in carboxyhaemoglobin levels below 10 per cent saturation are not fully understood, and further investigation of this matter should be encouraged."

### **Permissible Levels of Occupational Exposure to Airborne Toxic Substances**

*Sixth Report of the Joint I.L.O./W.H.O. Expert Committee on Occupational Health. W.H.O. Technical Report Series, 1969, No. 415; 16 pages, H.M.S.O., 4s.*

In the present state of development and modernization of industry and agriculture, hazards to health sometimes arise through occupational exposure to toxic substances. This report deals with some of the problems involved in limiting such exposure and so protecting the health of those concerned.

The problems involved in assessing the degree of exposure to airborne toxic substances are discussed, particular attention being paid to methods based on the measurement of levels in blood, urine, and expired air, and to the difficulty of correlating such levels with the degree of exposure. The report indicates that there are some fields in which further research will be required.

A comparison of the permissible limits used in different countries shows a wide measure of agreement on the levels adopted. "Safe concentration zones" for such substances are recommended for international adoption.

### **Measurement of Air Pollutants—Guide to the Selection of Methods**

*M. Katz, W.H.O., 123 pages, H.M.S.O., £1 10s.*

Some investigations of the incidence of air pollution are made through relatively simple procedures applied in a standardized manner, but others need trained workers in well-equipped laboratories.

This monograph surveys the whole field of qualitative and quantitative measurement in a comprehensive way, listing the methods available for identifying and estimating all the common pollutants; they range through sulphur dioxide, carbon monoxide, oxides of nitrogen, fluoride, lead, aldehydes and many other particulate and gaseous pollutants of significance to health and amenity.

The first half of the book is devoted to a general discussion of the fundamental principles on which air sampling and analysis are based, including chapters on photometric methods, gas analysis, and determination of carcinogens. The various procedures of measurement are then outlined, with mention of the sensitivity of each method and its suitability for different purposes; if still more detail is needed there are 282 references to original publications.

The methods mostly involve the chemistry of specific substances but it is pointed out that non-specific indicators are sometimes appropriate in estimating the approximate severity of pollution. Not all the methods require laboratory facilities. The botanically minded will be interested in deductions which can be made from observation of damage to particular species of cultivated and wild plants. It is also noted that the presence or absence of various forms of lichen in an area is closely related to different levels of pollution.

This is an authoritative work bearing evidence of careful preparation by Professor Katz and subsequent discussion between other experts of international repute. In addition to being a source book of methods it provides guidance towards uniformity of nomenclature and units of measurement which will enable studies made in different regions and countries to be more fully comparable.

*G.B.C.*

### **Solid Smokeless Fuel Federation Annual Report for 1968**

1968 was, for the Solid Smokeless Fuel Federation a year of change, a year of development and a year of increased activity. Before 1968 the Federation had concentrated its efforts on new smoke control areas, but due to changes in the fuel availability position it became necessary for many existing smoke control areas to be revisited so that advice on alternative solid smokeless fuels could be given. During the early days of smoke control, many areas were established on the basis of the use of gas coke in the approved open fire. Due to the technological changes in the gas industry and the coming of North Sea gas, the Federation, working in close co-operation with area gas boards, has been organizing meetings for local authorities to advise them that as the solid smokeless fuels from the gas boards are phased out, so other smokeless fuels suitable for the appliances installed in smoke control areas will be made available.

The report emphasizes that it is unfortunate that a statement relating to a shortage of one particular fuel in one particular area may quickly be misinterpreted by the press as implying a general shortage of all solid smokeless fuels. The Federation is satisfied that there has been no significant change in the overall fuel availability position and has advised the Clean Air Council accordingly.

During 1968 the Federation organized 250 weeks of exhibitions with local authorities for the general public or at conferences. This was an increase of 56 over the previous year, and the Federation is now spending some 60 per cent of its total income on exhibitions and displays.

### **The Women's Advisory Council on Solid Fuel—Twenty-fifth Annual Report**

This report reviews the work of the W.A.C.S.F. during 1968, and indicates an increase in activity. During the year a grand total of over 23,000 visitors to solid fuel centres is recorded. This represents an increase of 44 per cent over the previous year.



The Council increased the number of meetings that it held in the year by 14; this reflects a change of policy whereby more and smaller meetings, held wherever possible in the solid fuel centres and with the representatives of the industry present, are preferred. At such meetings, the report states, husbands frequently attended as well as their wives.

### **The Electrical Association for Women—Forty-fourth Annual Report**

This report deals very comprehensively with the activities of the Association during 1968 which is described as year of great variety and interest. The practical instruction offered by the Association has been welcomed by many different sectors of the community, and the Wise Consumer Campaign and its successor, the Home Planning Campaign has extended the range of subjects to which serious study has been given. The report comments that throughout the work of the Association, the interest of men and boys in electricity in the home has been very marked. Two further courses in cookery for men were arranged, and the report continues, while newcomers were enrolled, it was very gratifying that some of the original students continued to come for further instruction.

Interest in the Association's formal educational work has been further emphasized during the past year by the large number of educational exhibitions in which the Association took part. The Association states that it likes not only to be abreast, but ahead of the field in the information given on developments in electricity affecting the home, and therefore, members of the Association's Council have been given instruction and have heard the reasons for the new international colour coding for three-core flexibles. The report adds that detailed attention will be given to this subject during 1969. It is of interest, in this respect, that those who attended the Annual Luncheon of the Association were given a tea cloth which shows the new colour coding. The choice of the tea cloth was an interesting one when it is realized that in a further section of the report, it is stated that many more men are now showing interest in installing electrically operated dishwashing machines!

### **The Electrical Vehicle Association of Great Britain Ltd.— Annual Report for 1968**

In reviewing the activities of the Association during the year ended 31 December, 1968, the report intimates that a definite drive was made to implement an ambitious publicity programme to promote the electric vehicle industry, and specifically mentions Dr. Barak's very comprehensive paper on electric vehicles presented to the Clean Air Conference in Harrogate.

Further publicity was directed towards "International Lead Year 1968" which was aimed at increasing the market for lead-battery propelled vehicles.

During the year, 3,174 new battery electric vehicles were registered for use on the public highway; this was an increase of 154 over the figure for 1967.

This little booklet, prepared at the request of the American Medical Association Council on Environmental and Public Health, provides current information on environmental health problems, in this case air pollution, to the physician, the Medical Society, the community and voluntary health and scientific organizations. The booklet deals succinctly with the problems posed by air pollution, the sources of pollution, the assessment of air quality and the control of the sources of air pollution. At the end is useful list of references.

The booklet is produced in the United States and is written against a background of air pollution problems in the United States and United States Clean Air Legislation.

### ***Book from Norway***

We have received from the author, a book for our Library (in Norwegian) entitled "**Air Pollution in Norway**" by Walter Lindberg, a well-known Norwegian expert, who in 1959 presented a paper to the Society's International Diamond Jubilee Conference. His book is divided into three parts: I The general air pollution in Norwegian cities; II Public health aspects of air pollution—literature studies; III Correlations between air pollution concentrations and death rates in Oslo.

There are numerous tables, graphs and statistics, as well as 92 references (in English) covering world-wide literature.

## **Air Pollution Abstracts**

**1118. Effects of air pollution on design of carburettor die castings.** Bruton, R. C. (Die Castings Engr. (U.S.A.) Sept./Oct. 1968. **12**, No. 5. 30-34) (Zinc Dev. Absts. Ldn.). To comply with new regulations governing car exhaust fumes, carburettors with improved efficiency were developed by Rochester Products Division of General Motors Corp. The new designs introduced changes in the main zinc die castings of the carburettor. The modifications to the zinc castings of the standard two barrel carburettor include more cored holes and an adjustable part throttle mechanism. Altered designs have had the effect of using more zinc and the castings are now made on 600 ton hot chamber machines. Problems encountered in the production of Monojet carburettors are discussed.

**1119. A Critical Analysis of Three Field Surveys of C.N.S.L.D. Carried Out in the Netherlands.** Lende, Van Der, R. (Assen: Van Gorcum and Comp. N.V. 1969). (Vol. 1—Text; Vol. II—Tables 1-20) (Vol. 1, 165; Vol. II, 100) (Lancet). This is an interesting account of a careful series of studies on the epidemiology of chronic bronchitis in the Netherlands, aimed at differentiating between the influence of endogenous and exogenous factors in the development of chronic bronchitis. The work was done in three areas—a densely populated industrial town near Rotterdam, which has severe air pollution problems; a small provincial town; and a rural area. The methods were designed so that the results could be compared with those of surveys in other areas and other countries and included



the following: the standard Medical Research Council questionnaire on respiratory symptoms, lung-function tests using normal spirometry besides more complicated methods, sputum examination, chest X-rays, and tests for allergic susceptibility by scratch tests and by investigating the reactivity of the bronchial tree with the histamine-threshold test. The prevalence of symptoms and levels of lung function differ in both men and women in the three areas. The frequency of symptoms is greater and levels of lung function are lower in both men and women living in the industrial area than in those living in the rural area and small town. These results confirm other findings in other countries on the influence of environmental factors (urban and smoking) on the prevalence of chronic bronchitis. They are, however, of special interest in that, even in the worst areas, the levels of symptoms are lower and levels of lung function are higher than in Great Britain. The level of air pollution in the worst Dutch area was comparable with that of "clear" areas in Britain. It is thus apparent that the urban factor also operates in other countries than Britain.

**1120. Air Pollution Control Processes and Equipment.** Sittig, M. (Noyes Dev. Corp. Park Ridge, N.J. 1968. 4. 260) (transl. from "Industrie Chimique Belge"). It is envisaged in the field of air pollution that apart from research on pollutants, their nature, analysis and elimination, the known equipment and processes will also be turned to good account. Since patent literature contains detailed descriptions of processes and equipment, this volume draws the reader's attention particularly to this aspect of the problem.

In most of the cases, the author mentions processes and equipment which can be purchased or obtained under licence. The control of atmospheric pollution is developing very rapidly from commercial point of view.

Summary of the book: Introduction.—The state of our air.—Types of air contaminants.—Sources of air pollution.—Air pollution control devices.—Removing specific gases and vapours from air.—Equipment for removing solids and liquids from air.—Removing specific solids and liquids from air.—Removing automotive exhaust fumes from air.

**1121. The Oxidation of Sulphur Dioxide in Power Station Plumes.** Foster, P.M. *Atmos. Environ.* March 1969. 3. No. 2. 157–175). Some theoretical estimates are

made of the rate of growth of  $\text{H}_2\text{SO}_4$  droplets nucleated by  $\text{MnSO}_4$  crystallites in a humid,  $\text{SO}_2$  polluted atmosphere. Comparison with experiment suggests that, as the acid concentration within the droplet rises, the rate of growth decreases as a result of the product acid affecting the rate of  $\text{SO}_2$  oxidation. For this reason the amount of droplet growth, and the amount of  $\text{SO}_2$  oxidation, is very sensitive to the ambient humidity, and will be greatest for saturated or very high relative humidities where droplet acid concentrations are restricted to low values. Similar calculations relating to the dusty conditions present in power station plumes are also made. These show that the rates of  $\text{SO}_2$  oxidation observed in these systems can be accounted for by the catalytic qualities of the iron present in the effluent dust. It is suggested that other oxides present also play an important part in this process in that they react with the product acid as it is formed, thus keeping the droplet in a neutral condition in which the catalyst is most active.

**1122. A Proposed Canadian Standard for Estimating Atmospheric Dispersion of Combustion Source Pollution from Chimneys.** Whaley, H. (*Atmos. Environ.* March 1969. 3. No. 2. 177–195). Rising public concern over the persistent nature of air pollution may be expected to result in more stringent ambient air quality criteria. Hence, until air resource management becomes a reality, there is a requirement for a simple yet reliable method of estimating the dispersion of combustion source chimney effluents. To satisfy this need an empirical plume rise equation was developed and together with established diffusion equations, it provides the basis for the graphical stack height calculation method described in this paper. The emissions of gaseous and particulate matter are related to heat flux, stack height and maximum ground level pollution concentrations for both a severe atmospheric inversion and a neutral atmosphere. This enables the selection of a stack height to be made which should meet any stipulated ambient pollution level.

**1123. The Prevention of Atmospheric Pollution in Oil Refineries.** (In French) Liedmeier, G. P. (*Poll. Atmospherique, Special Issue* Feb. 1969. 3–8). The role of the CONCAWE Foundation is first described in brief: seventeen oil companies take part in it, representing eighty per cent of this industry in Western Europe.



It collects and provides a large amount of systematic information. Its permanent staff, assisted by five working parties, carry out some special surveys.

The fight against atmospheric pollution in the oil industry is examined. This fight is effective only if:

- (a) one knows the exact origin and effects of the polluting agents;
- (b) one lays down maximum acceptable levels for such agents;
- (c) one obtains the resources available for the fight;
- (d) one obtains everyone's collaboration, manufacturers and private individuals, to reach the goal sought if every person becomes "pollution minded".

The effect of atmospheric pollution is briefly discussed. Pollution agents arise during refining operations: sulphur dioxide, hydrocarbons, and nauseating gases are reviewed in turn, as well as their effects.

**1124. Air Pollution by Motor Cars, the Facts of the Problem, and their effects on Regulations and Methods of Measurement.** (In French) Lemaigre, P. (Poll. Atmospherique, Special Issue Feb. 1969. 20-23). The aim of this article is to briefly recall and define the various polluting agents emitted by motor cars, to describe the lines that could be followed by research bodies to reduce pollution, either before the engine (carburation) or after it (post-combustion systems) or in the internal design of the engine itself.

The article shows that the number of criteria that can intervene is such that, to draw certain general conclusions for reducing pollution, it is first necessary to improve measurement methods and instruments, from the threefold viewpoint of simultaneity, speed and selectivity of samplings.

**1125. Pollution of Air by Motor Cars, Developments in Legislation from the European Viewpoint, Comparison of Limits Provided for in Europe and the United States.** (In French) Chapoux, E. (Poll. Atmospherique, Special Issue, Feb. 1969. 24-32). Following up the article published in issue 39 (July/Sept. 1968) of the periodical *Pollution Atmospherique*, the author indicates the comparisons in severity of American and European cycles, from the point of view of:

- (a) the volume of exhaust, calculated by the American formula or

measured by the European procedure;

- (b) the weighted American contents of average measured European ones;
- (c) the bases of estimation; volume-mass ratio—total hydrocarbons or measured with an NDIR analyser.

The limits provided for internationally in Europe are given, and the formula for a weight-limit in terms of testing inertiae is explained.

Next comes an account for the resources available, short-term and long-term, for manufacturers, to meet these limitations within the deadline laid down.

**1126. Smoke Concentrations in South African Towns. Part IV Data for Oct. 1966 to Sept. 1968.** Kemeny, E. and Halliday, E. C. (Public Health, Feb. 1969). Results of smoke measurements carried out in various South African towns between Oct. 1966 and Sept. 1968 are published in tabular form.

**1127. New Concept for Central Recovery of Sulphur from Industrial Stack Gases.** ("Chemico World" April 1969. 4 No. 3. 6-9). The article describes current methods of SO<sub>2</sub> control and introduces Chemico's outlook for a new and commercially effective SO<sub>2</sub> recovery system via the central process plant. After an estimate of the SO<sub>2</sub> situation, the article reviews the non-recovery SO<sub>2</sub> control systems such as tall stacks, alkaline additives for SO<sub>2</sub> adsorption (dry and wet collection). Then, Chemico's plan is discussed whereby industrial plants could receive credit for sulphur recovery.

It is expected that the sulphur recovery step at the central plant would take one of two possible directions. Briefly, the alkali salts may be thermally reduced to yield rich H<sub>2</sub>S for a conventional Claus reactor producing elemental sulphur, or the salts may be calcined to release a concentrated gas stream for further processing to liquid SO<sub>2</sub> or sulphuric acid. Final marketing would determine the best recovery product. With either method, the alkali is regenerated for re-use back in the scrubbing cycle.

It is concluded that a systems engineering approach to the pollution problem for final decision making will yield more satisfactory results than simple equipment selection techniques.

**1128. Domestic Chimney Design.** Gibson, J. (J. of the Inst. of Fuel. 42 April 1969. 155-160). The need to match appliance



and chimney design in order to achieve efficient and trouble free systems is stressed. Factors governing domestic chimney design are critically reviewed, including types of fuels and appliances, flue dimensions thermal insulation, chimney terminals and materials of construction. The relative merits of traditional and prefabricated chimneys are discussed. Suggestions for research work and development are included, particularly in respect of materials used in chimney construction and systems suitable for prefabrication.

**1129. Effect of Flue Dust on the Vanadium Oxide Catalyst Utilized by the Contact Oxidation Process.** Kiyoura, R. (J. of Air Poll. Contr. Assoc. **19** No. 3. March 1969. 173-175). Concepts for controlling  $\text{SO}_2$  from fossil fuels can be separated into two main categories: (1) Residual and vacuum gas oil desulphurization and (2) Flue gas desulphurization. The Kiyoura-T.I.T. process confines itself to the desulphurization of flue gas. It employs vanadium oxide as a catalyst which oxidizes the sulphur dioxide to trioxide, followed by a gaseous phase reaction of ammonia. The end product, ammonium sulphate is removed by an electrostatic precipitator. (The details were presented at annual meetings of APCA in 1966 and 1967 as I and II). Flue gas is passed through cyclone and dust filter to remove dust. Under normal operating conditions almost all of the dust is removed at the filters. The author carried out experiments to determine whether there was any effect on the activity of the catalyst, assuming that a portion of the dust escapes into the stream along the flue. It has been generally accepted that in fuel oil firing steam power plants, about  $100 \text{ mg./nm}^3$  of dust including carbon, hydrocarbon, and ash are normally contained in the flue stream. The carbon and hydrocarbon is oxidized readily at the filters and exists only as ash. An amount of ash equivalent to the amount assumed to have settled on the catalyst over a period of 3-12 months, was placed on the catalyst, and experiments were carried out. The  $\text{SO}_2$

conversion efficiency was measured and found to be over 93 per cent. The results showed that at the actual operational temperature of  $450^\circ\text{C}$ , ash had practically no effect at all.

**1130. Lidar Applications in Air Pollution Research and Control.** Johnson, W. B. (J. of Air Poll. Contr. Assoc. **19**, No. 3. March 1969. 176-180). The fundamental capabilities and limitations of the lidar (laser radar) in observing particulate concentrations in the atmosphere are discussed. The advantages of the lidar technique stem from its ability to obtain measurements remotely and at a high density in space and time. The quantitative application of the technique is limited by the accuracies with which: (1) the separate effects upon the return signal of backscatter and attenuation may be identified; and (2) the optical parameters may be related to the characteristics of the aerosol. The main areas of utility for lidar in air pollution research and control are: (1) to observe the structure and height of mixing layers; (2) to measure the transport and diffusion of plumes or clouds of particulates; and (3) to remotely determine smoke-plume opacity. These applications are briefly reviewed and exemplified.

**1131. Fight against Dust in the field of Ceramic Industry.** (In German). Blasum, H. A. and Claus, D. (Staub. **29**, No. 2. Feb. 1969. 48-53). Since it has been found that the cases of silicosis in ceramic factories result from exposure to dust, the relative hazards due to the materials processed and to operations are established by assessing the preliminary case histories of the sick persons with respect of the working conditions. The results of recent dust measurements show, except for a few cases, satisfactory conditions as regards exposure to dust. These conditions have been achieved by changing the process, by eliminating silicogenous materials, by covering dust sources and removing dust by suction, and also by keeping the working places as clean as possible.

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A "news in brief" item which appeared in the *Sunday Telegraph* on 23 March stated that air pollution from industry and cars was killing thousands of cherry trees in Japan.

# INTERNATIONAL NEWS

## **Planning Meeting of the International Union of Air Pollution Prevention Associations, Dusseldorf**

On Tuesday, 15 April, 1969 representatives of Great Britain, U.S.A., France, Germany and Australia met in Dusseldorf in the new V.D.I. building for a two-day meeting devoted to activities essential to the development and extension of the Union.

Dr. Beck, Director of Verein Deutscher Ingenieure, hosts for the meeting, welcomed those attending and emphasized two vital factors if progress towards clean air was to be maintained, particularly in Germany—the contribution of youth and the importance of voluntary services being given by those in industry who were aware of the problems because of the nature of their work.

Dr. C. Barthel, President of the Union and Chairman of the meeting then traced the history of the Union since 1964 when six representatives of non-governmental bodies had met. He paid tribute to the role of Sir Alan Wilson and Mr. Arnold Marsh of the National Society for Clean Air in the formative stages of the Union.

After referring to the Buenos Aires meeting in 1965 and the significance of the London International Congress the following year, Dr. Barthel outlined plans for the 2nd International Conference to be held in the Sheraton Park Hotel, Washington D.C. from 6-11 December, 1970. He called for bi-yearly meetings of the Union and emphasized the need to strengthen and consolidate the organization.

Min. Dir. Stephany, President of V.D.I. Reinhaltung der Luft then pledged the support of the German section and paid tribute to the importance of the contribution made by the Air Pollution Control Association of America to the International clean air movement. Dr. Barthel then called on Mr. Alan A. Mister to give a report on the 1966 International Congress. Details of arrangements made and the financing of the project were commented on favourably by the members of the planning committee and it was resolved to convey a message of appreciation to the National Society for Clean Air, the headquarters staff and Mr. Arnold Marsh for establishing the high standard which would serve as a yardstick at all international conferences.



Mr. Arnold Arch, A.P.C.A. gave the meeting full details of the plans made for the International Congress in Washington. Twenty-eight countries had been approached and all had replied. A call for papers would be sent out on 15 April and the Heads of five international agencies had been invited to contribute technical papers. A world-wide press release would be circulated on 15 May, aimed primarily at encouraging attendance and on 15 June equipment, instrument and computer manufacturers from all parts of the world would be invited to occupy stand space at the exhibition which would be an integral part of the conference.

Dr. Cleary, Australia and New Zealand Clean Air Society, raised the question of delegates' fees and emphasized the importance of all members of the Union encouraging the submission of quality papers.

Dr. Barthel next called on the meeting to give serious thought to the date and venue for the 1974 Conference and urged 31 December, 1969 as the last date for submitting proposals. Rear-Admiral P. G. Sharp expressed the view that France might be willing to volunteer to provide facilities to which Dr. Sommer, Association pour la Prevention de la Pollution Atmospherique of France, intimated that further discussions with Germany would be necessary before a decision could be made. Rear-Admiral Sharp agreed to chair the steering committee set up to recommend the venue.

Dr. Barthel opened the Wednesday session by introducing the agenda item Criteria for Membership. He mentioned the time he had devoted to following up inquiries from national groups seeking membership of the Union and announced that, to date, only Mexico had met the criteria. The revisions proposed by Rear-Admiral Sharp were tabled and accepted as a basis for a re-examination of what constituted eligibility. The meeting then agreed to the establishment of a new form of membership from Governmental, Professional and Regional Bodies, only one from any country being acceptable.

The agenda involved all those attending in positive activity and interest reached its peak towards the end of the second day when the future of the Union was being considered. Mr. Arnold Arch referred to the generous financial help given by the A.P.C.A. totalling \$10,500 in the years 1968-70. This had permitted the publication of a brochure which, in its second edition would incorporate details of the aims and objects of national groups in an additional publication as well as a reprint of the original editorial matter revised and brought up-to-date.

Herr Kramer, V.D.I. Reinhaltung der Luft reminded the meeting of the International Union's responsibility to confront the problem of standards and the recording of pollutants. His organization felt that progress in this direction was imperative to avoid unnecessary duplication of effort and dissipation of funds. Means could be found to co-ordinate the efforts of experts in this vital field so that countries could share in the fruits of research.

Despite the long sessions on both days of the meeting members were able to meet socially as the guests of V.D.I., whose organization of the meeting contributed much to its effectiveness.

## **Consolidated Proposals by the Ad Hoc Meeting of the Economic Commission for Europe (10-14 February 1969)**

### *1. Creation of a Working Party of Air Pollution Problems*

The *Ad Hoc* Meeting agreed to recommend to the Commission the establishment of a continuing body for dealing with air pollution problems in the form of a Working Party on Air Pollution Problems. The Meeting suggested that the terms of reference of this new body might be as follows:

Taking into account the work of their E.C.E. subsidiary bodies already dealing with air pollution problems in their sphere of competence; and taking into account the relevant activities carried out under the auspices of the United Nations and related agencies, as well as the work done by other international inter-governmental and non-governmental professional and technical organizations in this field;

- (i) periodically to review trends, developments and government policies;
- (ii) to investigate economic and technical problems concerned with air pollution control, air pollution prevention and air quality amelioration;
- (iii) to promote exchange of scientific, economic and technical information.

### *2. Current Work Programme*

The *Ad Hoc* Meeting agreed to recommend to the Commission the following subjects on which work may be initiated and carried out during the period of 1969 and 1970:

#### *(a) Review and analysis of existing situation and future prospects in the Prevention of Air Pollution*

It was proposed that a review and analysis be made as appropriate on the basis of up-dated versions of the documents submitted by governments and by international organizations to the *Ad Hoc* Meeting.

#### *(b) Examination of Economic Studies*

An examination was proposed of the full range of economic studies of interest to the E.C.E., consisting of the following studies, as well as others:

- (a) cost benefit relationships associated with control of pollution problems should be considered on a common basis;
- (b) cost benefit relationships associated with control of pollution for specific industries considered on a regional or national basis;
- (c) delineation of economic losses and intangible losses related to specific pollutants and effects;
- (d) relative economics of alternative means of abating pollution (various types of control techniques, stack height variation, siting, etc.) from individual sources.

Stress should be laid on the development of methodology as well as its application to specific problems.

It was proposed that steps be taken to review the present status of economic studies related to air pollution, delineate the range of problems needing assessment and suggest an appropriate programme and the organization of the work to be carried out.



(c) *Desulphurization of Fuels and Combustion Gases*

Recognizing the world-wide importance of the sulphur oxides pollution problem, the major contributions of fossil fuel combustion to such pollution and, in addition, taking note of the interests of other international organizations conducting programmes in this field, it was proposed that the E.C.E. sponsor a seminar, attended by technical experts, to present, discuss and exchange information on past and current research activities. Participants in such a seminar would include government-appointed experts from countries with an interest in and conducting research in this field, and in addition, secretariats of international groups with current programmes in this sphere.

(d) *Exchange of Scientific, Economic and Technical Information*

It was suggested that an exchange of documentation of a scientific, economic and technical character should be encouraged to take place directly between interested countries, using the list of participants to the present *Ad Hoc* Meeting.

## Report from U.S.S.R.

Mr. A. V. Pavlov of the U.S.S.R. Ministry of Health submitted a report on the protection of the atmosphere in his country, to the *Ad Hoc* Meeting of Governmental Officials of the Economic Commission for Europe last February. From this report it is clear that the problem of air pollution has also assumed major importance in the Soviet Union.

Activities in the field of pollution prevention are mainly directed towards:

The study and evaluation, from the public health standpoint, of the atmospheric environment of towns and industrial centres;

The study of the effect on public health of air pollution by industrial emissions and motor-vehicle exhaust gases.

In addition to the sanitary and epidemiological centres, public health research institutes and faculties of medical institutes also carry out research on the effects of air pollution emissions of health and hygiene. Since research is conducted according to a uniform approved method, comparable data is available.

Fixed sampling points have been established to measure air pollution in towns and industrial centres—twenty-five such points are in Moscow. The sampling points are sited deliberately in various kinds of districts. On the basis of the data received, proposals are drawn up concerning measures for the purification of industrial emissions to the atmosphere.

The following compulsory measures exist in the U.S.S.R. in order to protect the atmosphere against pollution:

1. Plants, shops, units and power stations discharging harmful substances to the atmosphere may not be commissioned, unless measures have been taken to ensure that the concentration of these substances has been reduced to the admissible sanitary levels. Projects must be authorized by the State sanitary and epidemiological service.

2. The approval of projects for the construction of new, and the extension of existing enterprises with industrial emissions, is subject to the compulsory provision of efficient means of purifying such emissions.

3. New industrial enterprises with emissions which are not arrested by modern purification equipment, no methods having so far been devised for arresting or rendering them harmless, may be sited only outside built-up areas and urban green belts and only with the compulsory approval of the organs of the sanitary and epidemiological service.

All other undertakings are classified in five categories for public health purposes, depending on the harmful substances emitted, the characteristics of the technological process involved and the application of measures for cleaning harmful emissions to the atmosphere.

The report states that where the construction of large solid-fuel-fired stations is concerned, in view of the difficulty of obtaining a high degree of efficiency in the standard ash-removing equipment and the lack of desulphurization equipment, it is proposed to install smoke stacks up to 250 metres high. Operations have been considerably expanded and prolonged tests carried out on an industrial scale of equipment for desulphurizing power station flue gases having concentrations of 0.3 per cent of sulphur dioxide; this equipment uses the ammonia-cycling method and has a gas throughput of 240,000 N/m<sup>3</sup>/h. Work is also continuing on the replacement of the combustion of liquid sulphurous fuels (fuel oils) at power stations by purified gas obtained by the gasification of fuel oils.

## U.S.A.

### **New Clean Air Regulations**

From 7 February, 1969, the District of Columbia has new Air Quality Control Regulations. The sulphur content of fuel oil is limited to 1½ per cent immediately and to 1 per cent after 1 July, 1969. The sulphur content of coal is limited to 1 per cent after 1 July, 1969. Particulate emissions are limited to 0.60 lbs. per one million B.t.u. input for installations of less than ten million B.t.u. per hour. For larger installations, the rate of particulate emissions decreases as the rate of heat input increases.

After three years, all incinerators in use must be of multiple chamber design or of other approved design. Incinerators of a rated refuse burning capacity of 200 pounds per hour or more are limited to a particulate emission of 0.20 grains per standard cubic foot of exhaust gas. Smaller units are allowed 0.30 grains. Open burning is prohibited after 1 May, 1969. Other provisions limit odours, visible emissions, internal combustion engine emissions and process emissions.

### **CALENDAR FOR CLEAN AIR CONFERENCES**

We have information about the following meetings in Australia, U.S.A. and Europe for 1969:

19-22 May: Clean Air Conference at the University of New South Wales,



Sydney. Sponsored by N.S.W. Department of Public Health, The Clean Air Society of Australia and New Zealand and the University of New South Wales.

29 May-4 June: The 4th Pro Aqua Exhibition, the 4th Pro Aqua Technical Conference and the 4th International Congress of the International Research Group on Refuse Disposal (I.R.G.R.) will be held at the Swiss Industries Fair, Basle, Switzerland.

22-26 June: 62nd Annual Meeting of the Air Pollution Control Association "Cleaner Air Thru Co-operative Action", Hotel Americana, New York.

14-16 October: "Actual Ways towards Clean Air" V.D.I. Dusseldorf.

21-23 October: International Air Pollution and Water Conservation Conference to be held in Basle and arranged by The British Non-Ferrous Metals Research Association (Euston Street, London, N.W.1).

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## **OBITUARY - ARNOLD MARSH**

We deeply regret to announce that Mr Arnold Marsh O.B.E. who was Director of the Society for forty years until 31 May 1968 died in hospital at Banstead, Surrey at 5.30 p.m. on Tuesday 3 June 1969.

A full obituary will be published in the next issue of this journal.

# News from the Divisions

## North East

On Saturday, 5 October, 1968, a joint meeting was held with the North of England Thoracic Society to discuss matters of mutual interest. A total of 25 members from the North East Division and the Thoracic Society attended this meeting. Alderman B. N. Young, O.B.E. in a welcoming speech explained the purpose of the gathering and emphasized the close association between clean air and health. The chair was then taken by Dr. Coutts, Chairman of the North of England Thoracic Society.

Dr. Ian Gregg, Consultant Chest Physician spoke on the Relative Importance of Smoking and Atmospheric Pollution in the Pathogenesis of Chronic Bronchitis, and introduced his subject by referring to a number of case histories of chronic bronchitis and by means of graphs and statistics demonstrated the change in the various physical conditions and related these to smoking habits and season of the year. He referred to the close connection between cigarette smoking and air pollution on respiratory health with particular emphasis on the interaction of each factor. This address was followed by a short but lively discussion in which many members participated.

Professor Peter C. G. Isaac, Vice-Chairman of the Divisional Council and Professor of Civil and Public Health Engineering, University of Newcastle upon Tyne then presented a paper on the Control and Prevention of Air Pollution. He divided air pollution into grit and dust, smoke and gases and dealt with the causes, concentrations and distribution of each pollutant. He continued by referring to the national survey of air pollution and gave figures of concentrations of smoke and sulphur dioxide in various parts of the country and in various types of districts. His paper included references to motor vehicles and the control of sulphur oxides and concluded by a brief description of examples of district heating. This address was followed by a discussion ranging over both papers and in which both speakers answered questions or expanded on the points they had made during their dissertation.

The Chairman of the Division, Alderman B. N. Young, proposed a vote of thanks to both speakers for such excellent and topical papers and included in his thanks appreciation to Professor Isaac and his staff for making the arrangements for the meeting and for providing such enjoyable hospitality. This vote of thanks was carried with unanimous support and the meeting closed.

On 23 April last the Division held its annual meeting at the Miners' Welfare Institute, Washington, Co. Durham. The event began with a welcome from Councillor F. C. Parkin, Chairman of the Washington U.D.C., who praised the efforts of the Society in the cause of clean air and invited delegates to inspect a district heating scheme recently installed by the National Coal Board. After



coffee, members were conveyed by coaches to the group heating scheme at Edith Avenue, Washington, where three G.W.B. Powermaster coal-fired boilers had been installed to provide heat to 620 dwellings in four, five and six storey blocks. In addition to inspecting the boiler house visits were also paid to some of the flats where the occupiers expressed great satisfaction with their means of heating, particularly with regard to costs. Delegates then returned to the Welfare Institute to be entertained to lunch as guests of the Board.

At the conclusion of the lunch Mr. L. V. Penzer, the Deputy Regional Marketing Director of the National Coal Board, expressed his pleasure at the Division being present to see at first hand the operation of the Washington district heating scheme and he made a brief reference to the symposium which formed the subject of the annual general meeting later in the afternoon. Alderman B. N. Young, O.B.E., Chairman of the North East Division, replied and included in his address thanks to the N.C.B. for their hospitality which had been enjoyed by all present. He also referred to the presence of Rear-Admiral P. G. Sharp, the Director of the Society, upon whom he called to speak for the first time in his north east division. Rear-Admiral Sharp, in a very amusing contribution, referred to his close and earlier associations with the North East and also mentioned that he possessed a little known qualification, (presumably of Naval origin) which bore witness to his practical experience in boiler management and therefore he was not without some professional background when dealing with the subject of the morning visit.

The business meeting followed and during the course of the Chairman's address, Alderman B. N. Young, referred to the problems which had emerged during the previous twelve months and made particular reference to the coming crisis caused by the disappearance of Gloco from existing smoke control areas. He tended to blame these fuel supply difficulties for the unhappy position in which the Northern Region finds itself so far as progress in smoke control is concerned. The financial impact of having to install more expensive appliances in north-eastern smoke control areas impelled him to reiterate what he had said on many previous occasions that the problem of smoke control is a national problem and therefore the whole of the financial burden should be borne by the Exchequer. He also referred to the advent of the Clean Air Act, 1968 and made a brief summary of the effects that this new legislation would have on the cause of clean air in the north east. He concluded his remarks by informing the meeting that the new Director and Secretary of the Society, Rear-Admiral P. G. Sharp, was present at the meeting and remarked upon the coincidence that in 1968 the then Director was present to say farewell and within a year the new Director was making his introductory visit to the North East Division.

The election of officers resulted in the re-election of Alderman B. N. Young, O.B.E., as Chairman; Vice-Chairmen, Councillor T. P. S. Prudham and Professor P. C. G. Isaac; Honorary Secretary and Treasurer, L. Mair and Honorary Auditor, F. Ireland, City Treasurer of Newcastle upon Tyne. The business meeting was followed by a symposium entitled "The Smokeless Use of Coal" introduced by Mr. L. V. Penzer, the Deputy Regional Marketing Director, Northern Sales Region, National Coal Board. Mr. Penzer was supported by a panel of experts comprising Mr. J. Barratt, C.U.C., Mr. J. C. Blacklock, A. H. Services; Mr. T. Vickers of the S.S.F.F., and Mr. W. A. Waite of the Coal

Merchants Federation. Mr. Penzer opened his address by emphasizing that both the N.C.B. and the coal industry support the clean air movement without condition or qualification and referred to the development of district heating by the smokeless use of coal as evidence of this. After dealing with the general principles of district heating and referring particularly to the economics of heat distribution, he invited local authorities represented at the meeting to solicit the assistance of the National Coal Board in the preparation of feasibility studies for any local authority heating schemes that might be contemplated. Mr. Penzer made particular reference to condensation in dwellings and the costs thereof and explained how these had been overcome by the advantages of district heating. He then went on to discuss the development of solid smokeless fuels and the difficulty created in the north east by the diminution of Gloco. He then gave a detailed account of the Felling experiment where 158 houses were being supplied with six cwts. each of Rexco, Burnbrite and Gloco without the tenants being aware of which particular fuel they had obtained. The experiment to determine the costs, acceptability by householders and the use of these new fuels, had been recently completed by the Board's research organization but it might be misleading to give to the meeting an incomplete picture while the necessary statistics had not been collated. It was expected that the final report would be available in three or four weeks' time, but in the meantime Mr. Penzer wished to refer to the introduction of the Housewarmer, a solid fuel appliance capable of burning bituminous singles smokelessly. About 2,000 of these appliances have been manufactured and it was interesting to note that they had been designated as an exempted appliance by the Minister.

The discussion that ensued covered a wide range and included the cost of the Housewarmer and difficulties of use by uninformed tenants; availability of coke supplies and in one case a query concerning the shortage of coal for use in the Housewarmer. Information on the activities of the Associated Heat Services Ltd., was asked for and later comments related to condensation and all its aspects.

The Chairman then called upon Mr. R. Emerson, the Chief Public Health Inspector of Hartlepool C.B., to propose a vote of thanks to Mr. Penzer and the panel of speakers and to staff of the N.C.B. for the excellent arrangements that had been made for holding the meeting. This vote of thanks was carried unanimously and enthusiastically. The Chairman then declared the meeting closed and members were then entertained to tea at the kind invitation of the National Coal Board.

The delegates then dispersed having spent in Washington a most pleasant and informative day.

*L. Mair, Hon. Secretary*

## **North West**

The Division held its Annual General Meeting at the Castle Irwell, Manchester Race Course on Thursday, 27 March, 1969 when 160 members of the Division were addressed by the Director of the Society, Rear-Admiral P. G. Sharp.



Members were entertained to lunch by the National Coal Board after which Mr. John Brass, C.B.E., Chairman of the North West and North East Coal Boards spoke on the availability of smokeless fuels.

The National Coal Board's policy was to make available adequate supplies of solid smokeless fuels in the widest possible range to give consumers the widest possible choice, said Mr. Brass.

Apart from the provision of smokeless fuels, a great deal could be done by the introduction of district heating schemes burning bituminous coal smokelessly from central boiler plants. The Board had also developed a solid fuel room heater—The Housewarmer—which would burn certain types of bituminous coal smokelessly and of which production of standard models had commenced. The production of the new room heater represented a major break-through in the fight for cleaner air at low cost.

Since the publication of the Government White Paper on Fuel Policy there had been some misgivings expressed about the future availability of coal. But the White Paper had made it quite clear that the ability of the coal industry to maintain a share of the market would depend upon its productivity and its ability to be competitive in cost. That was why the industry was making an out and out drive on productivity which last year increased by nine per cent compared with the previous year.

"With productivity going ahead so rapidly I suggest that anybody who still has in mind the White Paper figure of 120 million tons of coal output in 1975 should throw it out of the window and should think more in terms of 135 millions recently quoted by Lord Robens as nearer the mark," Mr. Brass said and added that a recent study of the supply and demand situation had satisfied the Board that capacity already installed would be more than adequate to meet the immediate demand for smokeless fuels and to make good the run down in Gas Coke availability. Board was also satisfied that future demands for smokeless fuels would be met by the combined resources of the Board and the independent producers.

In an expanding market there was always the possibility of temporary shortages of specific fuels and in periods of peak demands there was always the possibility that these particular shortages would make headlines. It would be wrong to assume from these temporary shortages that overall they were unable to meet the market's requirements. For closed appliances the Board was increasing the capacity of Sunbrite for the domestic market, there was plant capacity to treble the original output level of Multiheat and additional plant was being brought into stream for Phurnacite. For open fires the availability of Homefire was rapidly increasing and the output of Coalite and Rexco was also going up. Burnbrite, another open fire fuel, had been introduced and was becoming more popular.

The Board was being well served by designers and manufacturers of domestic solid fuel appliances. Even the traditional open fire with fan assisted draught could burn all types of smokeless fuels efficiently and economically. The solid fuel roomheaters had had most notable success in the domestic market. All these appliances were capable of providing some form of central heating.

Mr. Brass added that more than 30 coal fired district heating schemes had already been commissioned or were starting shortly throughout Britain. There was a scheme already operating in Oldham and others were under negotiation throughout the North West. The Board was determined to develop this field and had formed a separate company with two private companies under the title "Associated Heat Services Limited". There was no doubt that district heating schemes in high density and high rise projects formed an ideal answer to the problems of Clean Air and efficient heating services.

The Board was also very conscious of the implications of the new Act regarding coal deliveries in smokeless zones. Throughout the Board's organization and the private merchants' trade steps had been taken to ensure that the terms and the spirit of the Act would be met.

Mr. Brass concluded: "The National Coal Board as a body and we who serve the industry are entirely at one with the aims and objects of your Society. We and our colleagues in the private sector will produce and make available to the public sufficient and suitable solid fuels to enable people to be adequately heated either by smokeless solid fuels or by other solid fuels smokelessly burned in suitable appliances. With our exceptional rate of productivity improvement we intend to remain in business exploiting the one great natural mineral asset that we have for many years to come".

*W. E. Pollitt, Hon. Secretary*

## **West Midlands**

At the annual meeting of the West Midlands Division held at the Worcestershire Hotel, Droitwich on Thursday, 10 April, 1969 a National Coal Board technologist explained that usually simple, practical remedies enabled industrial plant to meet the requirements of the Clean Air Act 1968 without the necessity of installing expensive and complicated grit collecting apparatus. Mr. H. V. Cranham in giving this reassurance told the meeting there was no doubt that properly installed and operated solid fuel boiler plant would meet the requirements of the Act. When difficulties arose, he said, these were mainly due to some local circumstance and there was a need to develop a simple apparatus which could identify the size of the problems and the time of origin. The apparatus should be simple to operate and as cheap as practicable, but he added that determining grit emission levels was a skilled operation which could prove costly. He demonstrated to the meeting a simplified apparatus developed by Coal Board Fuel Technologists during surveys of industrial plant.

The new Bill places the responsibility of testing plant burning between 100 lb. fuel per hour and one ton fuel per hour for grit, dust and fume emission on the local authority, but the National Coal Board freely offered to industrialists a Technical Service giving advice on ways of meeting the Clean Air Act, commented Mr. Cranham. Dealing with new techniques being developed for the burning of solid fuel Mr. Cranham referred to current investigations into fluidized bed combustion. Work in this field has been international and some of the earlier design studies had been carried out by the Central Electricity Generating Board with a view to their possible use in power station size boilers.





West Midlands Annual Meeting. Looking at the exhibit arranged by the N.C.B. are : from left to right, Mr. D. M. Fletcher of the N.C.B. ; Alderman T. Parkin, Chairman of the West Midlands Division ; Mr. R. K. Crow, Vice-Chairman ; Mr. W. L. Kay, Divisional Secretary ; and Mr. W. L. Dulson of the N.C.B.

Referring to solid fuel supplies Mr. W. Dulson, N.C.B. Midlands Marketing Manager (Commercial), told the meeting that generally speaking there were sufficient supplies of smokeless fuels available and the increased tonnages of Multiheat, Homefire and Rexco were expected in the market in the near future. So far as Board products were concerned, disposals of smokeless fuels would be almost 400,000 tons up on last year, he added.

Members viewed the film "Objectif Chaleur", which describes District Heating Schemes, and watched a demonstration of sampling probes mentioned in Mr. Cranham's talk.

*W. L. Kay, Hon. Secretary*

## East Midlands

An afternoon meeting of the East Midlands Division was held at the West Burton Power Station, of the Central Electricity Generating Board, West Burton, near Retford, on 11 March, 1969, at the invitation of the Station Superintendent—sixty-four members attending.

Members were welcomed by Mr. D. Wells, the Station Superintendent, who gave a brief explanatory talk on the history and layout of the station prior to a tour of inspection. West Burton, he said, was one of 12 similar stations in the country, each with a generating capacity of 2,000 M.W., together with its near



neighbour—Cottam Power Station—it could supply approximately 1/10th of the national demand for electricity. Coal, the fuel used in this power station, was mainly obtained from Nottinghamshire and South Yorkshire Collieries—nearly five million tons per year being consumed. Mr. Wells made the point that this and similar power stations were vital to the prosperity of the coal industry.

A conducted tour of the station followed, commencing in the vast Control Room from which the four generating sets on the station can be operated by push button control, and in which it was possible to see the total electricity supply going into and being taken from the national grid at any time. In addition to the four 500 M.W. turbo generators, there are four 17.5 M.W. gas turbo-generators powered by Rolls Royce Avon engines, which would supply power to run the station in the event of failure of the grid, and these are also available to augment the station's output at times of peak load. It was stated that these gas turbines would be sufficient to restart the station, should it become completely isolated from the grid system, and thus avoiding the chaos which occurred in New York following the breakdown of the electric supply system.

Members were particularly interested in that part of the station concerned with ash and dust extraction, as this has an important bearing on atmospheric pollution from coal fired plants of this size. The burning of five million tons of pulverized fuel, with an ash content of approximately 20 per cent must inevitably create problems if gross pollution over the surrounding countryside is to be prevented, the size of the problem in this case being the collection and disposal of some 950,000 tons of ash and dust per annum. The ash under the boilers is collected and sluiced away by pressure jets of water to ash crushers and the slurry is pumped to settling tanks where the water is decanted off and the precipitated ash is loaded into road or rail trucks. The dust in the flue gases is extracted by batteries of mechanical dust collectors and by Lodge-Cottrell electrostatic precipitators which have a combined efficiency of 99.3 per cent.

The dust collected is then blown by compressed air through pipes for a distance of nearly half a mile to dry dust bunkers from which it is fed into sealed cement type wagons on permanently coupled trains for disposal in the Peterborough area. The cleansed flue gases are then discharged into the atmosphere from two concrete chimney stacks 600 feet high, each of which is equipped with smoke density recording and alarm systems.

After tea, taken in the Staff Dining Room at the kind invitation of the Board, there followed a Question Time when Mr. Wells, the Station Superintendent and Mr. A. Martin, the Board's Scientific Officer who has been responsible for the survey carried out in the district on atmospheric pollution, before and after the building of the station, undertook to answer members' questions.

The level of pollution around High Marnham and West Burton Power Stations was established before the stations went into operation, said Mr. Martin, 12 dust gauges and 12 volumetric gauges being used to ring the area at distances of  $\frac{3}{4}$  mile to five miles from the stations. Comparisons before and after the stations became operative showed very little increase in the level of pollution. The results of a two-year study showed that 90 per cent of the pollution in the area came from sources other than the power stations. Answering a question raised by Dr. Davies at what point peak concentrations of sulphur



dioxide were found, Mr. Martin stated that this usually occurred about five miles from the station, but even here concentrations rarely exceeded four parts per hundred million/hour. Conditions of temperature inversion made little difference to pollution in the area from station pollution for most inversions start at about 500 feet, and the flue emissions discharged at 600 feet, were well above the inversion strata. Mr. Martin said that research into the emission of  $\text{SO}_2$  was continuing and records were being taken continuously by 28 recorders in the area.

Discussing the future of electricity generation with particular reference to the competition from nuclear power stations, Mr. Wells gave comparisons in the capital expenditure and production costs and stated that whilst a station like West Burton costing between £75 and £80 million to build produced electricity at 4d. per therm, a nuclear power station would cost approximately twice as much, but could produce electricity at possibly a fraction of 1d. per therm. Nevertheless he felt that there was a place in the country's economy for the coal burning station for many years to come.

Closing the session, the Chairman, Councillor F. Brothwell, expressed the thanks of the members to Mr. Wells, Mr. Martin and all those who had contributed to this most interesting meeting, and to the Central Electricity Generating Board for permitting the visit and for the hospitality provided.

*G. Drabble, Hon. Secretary*

Radio Leicester "Breakfast Club" interviewed Mr. G. B. England, Public Health Inspector, Blaby Rural District Council, on 22 April, the occasion being the holding of a Clean Air Exhibition in South Braunston. Mr. England explained that the purpose of the exhibition was to give local people some idea of the work of the Public Health Department in smoke control and clean air though in the course of the interview Mr. England agreed that its primary object was to show people how they could heat themselves without making a lot of fumes.

Air pollution measuring equipment was being used to try and limit as well as measure the various pollutants and Mr. England went on to describe the amounts of deposit of suspended matter as amazing; grit, soot and unburnt carbon being singled out for mention. Mr. England then quoted facts from the N.S.C.A. pamphlet "The Air You Breathe" and the interviewer, Mr. B. Kennedy, described them as frightening and inquired how they affected people.

Mr. England mentioned the English disease—bronchitis, and drew attention to an exhibit showing healthy lung tissue and the tissue of the lung of a bronchitic sufferer, which was almost black as a result of living in a "black area".

Mr. Kennedy went on to inquire what was being done to make the air cleaner and referred to U.S. laws to reduce road vehicle pollution, a nuisance which he felt caused a tremendous amount of suffering in England. To this Mr. England replied that it had not been properly confronted in this country to date but eventually legislation would be brought in to control this to some extent as in America. Mr. England stated that in the long run pollution added a strain on the heart and emphasized that heart disease was a big killer.

In answer to Mr. Kennedy's request for details of the chief causes of air pollution Mr. England accepted that the contribution of large factory chimneys was significant but reminded listeners that three-quarters of the pollution in the air came from domestic coal burning fires discharging grit and soot into the atmosphere. He went on to say that all Public Health Inspectors would like to see vehicle emission controlled.

The Society supplied posters and display material as well as leaflets to this exhibition.

## South East

The forty-third meeting of the Council of the Division was held at the Film Theatre of Colour Film Services, 22-25 Portman Close, London, W.1, on Wednesday, 26 February, 1969, to consider a full agenda dealing with the life of the Division. It was reported that the Measurement of Grit and Dust course was to be started at Tottenham Technical College on 17 April, 1969. The members then considered visits for 1969 and agreed arrangements for members to inspect the British Leyland Works, Oxford on 26 June, the N.C.B. "House Warmer" in October and B.P. Research Establishment, Sunbury, Methane Gas Terminal, Canvey Island and the Incinerator Plant at Middleton later in the year.

Industrial bonfires and the new Act, Chimney Heights and the demolition of buildings were other matters dealt with and it was agreed that efforts should be made to arrange a debate between Mr. Furness of the Ministry of Transport and Professor R. S. Scorer on the subject of pollution from road vehicles.

In the afternoon there was a film show presented by the Motherwell Bridge Tacol Ltd., attended by over a hundred members and representatives of the Division. The theme of the show was incineration, and plant now being built for the Greater London Council and the City of Glasgow was described in the first film "No Tipping" (reviewed on page 245 of the spring issue of *Smokeless Air*). A second film "Carbecue" described a new method of disposing of abandoned and unserviceable motor cars.

*John S. Hodgins, Hon. Secretary*

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# **INDUSTRIAL and COMMERCIAL NEWS**

## **Cibel Gain £65,000 Contracts for Gas Cooling and Dust Collection Systems**

Two contracts worth a total of more than £65,000 for Gas Cooling and Dust Collection Systems have been won by the Cibel Engineering Co. Ltd., Walsall, the U.K. manufacturers of Intensiv Filter GmbH, equipment. The first contract is for Brookside Metal Co. Ltd., Willenhall and the system which will handle exhaust gases arising from oil fired rotary brass furnaces, includes a fabric filter dust collector and an induced draught plate gas cooling unit. The second contract placed by British Copper Refiners Ltd., Widnes is for the installation of an evaporation spray water gas cooler and a fabric filter dust collector to handle the exhaust gases from a secondary copper blast furnace.

## **Packaged Electrostatic Precipitators**

W. C. Holmes & Co. Ltd., Huddersfield recently announced an extension to their range of dust collection and control plant with the introduction of a packaged electrostatic precipitator to meet the need for a low cost, high efficiency gas cleaning plant designed to handle gas volumes up to 25,000 c.f.m.

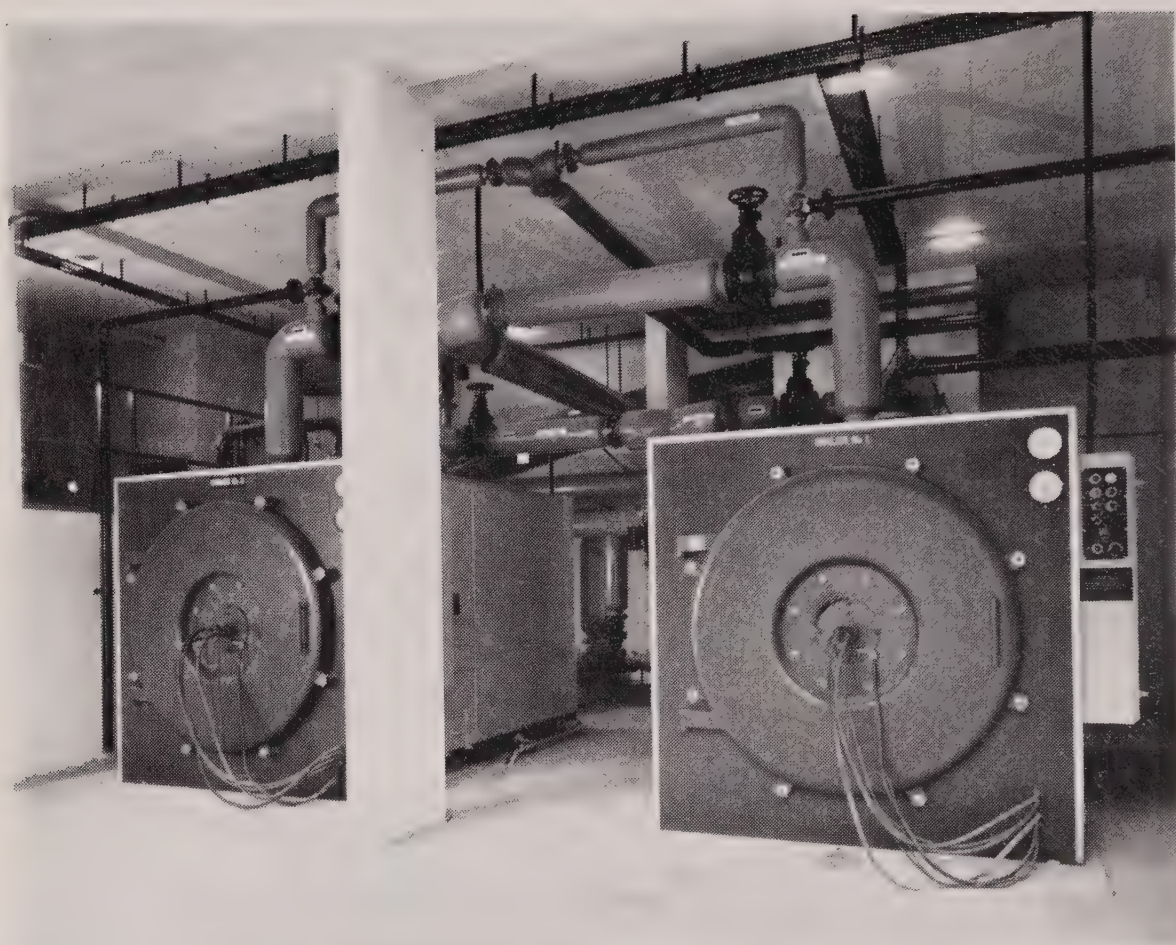
Whilst the packaged unit operates on exactly the same principle as individually designed large scale units, it embodies a number of additional design features, the most important of which is that unbreakable point discharge electrodes are used.

Each unit is complete in itself—on delivery to site all that has to be done to set the unit to work is to place it in position on a previously erected support structure, make the inlet and outlet connections and connect the low tension wiring between the H.T. rectifier and the separately mounted control panel.

## **British Standards for Domestic Central Heating Boilers Burning Solid Smokeless Fuels**

A British Standard has been provided now on this subject dealing with the essential constructional and performance requirements and methods of test for these boilers. This is in two parts of B.S. 4433 Independent thermostatically controlled central heating boilers with rated outputs up to 44 K.W., these are Part 1: 1969 Boilers with undergrate ash removal designed to burn solid smokeless fuels and Part 2: 1969 Gravity feed boilers designed to burn small anthracite.

## District Heating by Oil Marsh Farm Estate (Phase 1), Luton



The two Cochran Clausman oil-fired boilers serving the Marsh Farm District Heating Scheme at Luton

Marsh Farm Estate is a development by the County Borough of Luton which, when completed, will provide homes, shops, schools and other services for some 10,000 people. Phase 1 of this development consists of houses and maisonettes which are being served by a Shell-Mex and B.P. Central oil storage and distribution system, and 336 flats in three 15-storey tower blocks served by an oil-fired District Heating scheme operated and maintained by Shell-Mex and B.P.

Each of the three blocks contains 112 flats, comprising six two-bedroom flats and two one-bedroom flats on each floor. Two-hundred and twenty garages and additional car parking areas are also provided. The scheme has been designed and installed by Southern Heating Ltd., Maidenhead, Berks.

One heat station situated beneath the centre block of flats serves the entire system. The boiler plant consists of two Cochran Clansman boilers, each rated at six million B.T.U./h. One chimney incorporated in the structure of the block



serves both units. A control cabinet houses controls, and running and trip indicators for all major units. Fuel gauges, temperature recorders, B.T.U. output recorder, running hours recorder and flue gas smoke monitoring equipment are also contained in this cabinet. The heating system is open-vented, cold feed and expansion being provided by means of a 500 gallon tank situated on the roof of the block. The system has been designed as a low-pressure hot water installation and is protected against excess pressure and temperature, loss of head and leakage. Safety devices are incorporated which in the event of abnormal conditions sound a warning bell in the caretaker's flat above. The main air intake is provided with a shutter which will close in the event of excess temperature in the boiler room.

The fuel, Shell Domestic Fuel Oil, is stored in two 10,000 gallon horizontal, cylindrical tanks installed below ground adjacent to the heat station. Fuel is fed to the burners by a duplicated pumping system which ensures continuity of supply.

*Type of development:* Three 15-storey tower blocks, each containing 112 flats.

*Heat station:* One, in basement of one tower block.

*Boilers:* Two Cochran Clansman units, each rated at six million B.T.U./h.

*Burners:* Brockhouse Modulating M.P.A.

*Oil storage:* Two 10,000 horizontal, cylindrical tanks below ground adjacent to heat station.

*Fuel:* Shell Domestic Fuel Oil.

### **Distribution system**

*Heating mains:* Two-pipe system, fully insulated.

*Circulating pumps:* Two 40 h.p. Sigmund Pulsometer pumps.

*Consumer installations:* Warm air. Copperad W.A.C. fan-assisted with ducts to living room, kitchen, hall and bedrooms. Thermostat control provided. Indirect cylinder for domestic hot water supply.

Similar district heating schemes are scheduled for Hebburn-on-Tyne, South Petherton in Somerset, and East Kilbride in Lanarkshire.

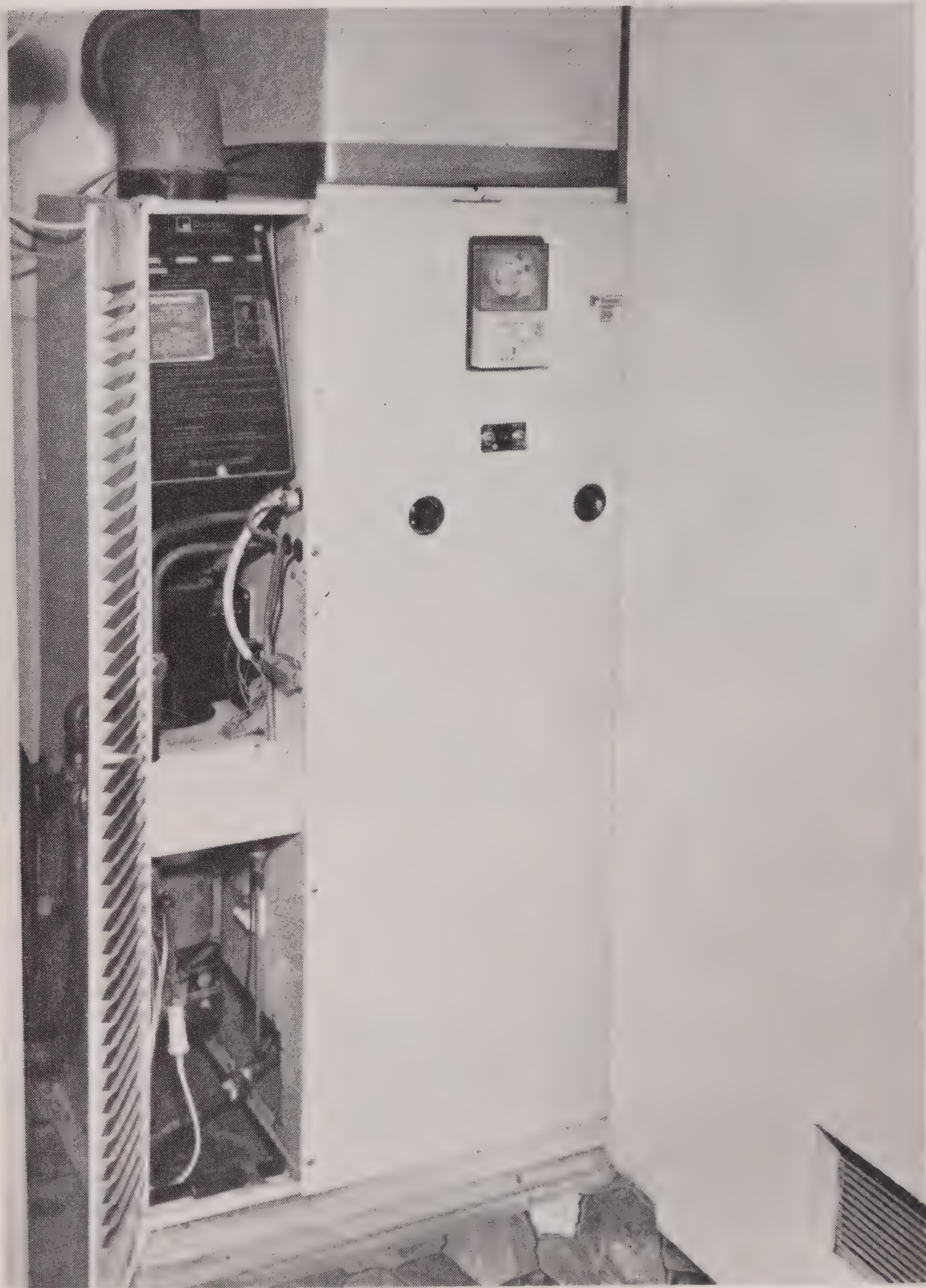
## **District Heating in Doncaster**

One of Britain's most ambitious coal fired district heating schemes is currently being developed over an area of one square mile in Doncaster.

A central heat generating station has been provided at Coal House, a 12-storey office block housing headquarters departments of the National Coal Board.

As well as providing heat and hot water services to Coal House, the boiler installation is now linked to a wide range of buildings on the neighbouring Civic Centre complex and to the first phase of a 1,200 dwelling development of flats and maisonettes more than a quarter of a mile away.

## Warm Air Central Heating Unit with "Personal Contact" Control



The Duclair 30 ducted gas central heating system by Radiation

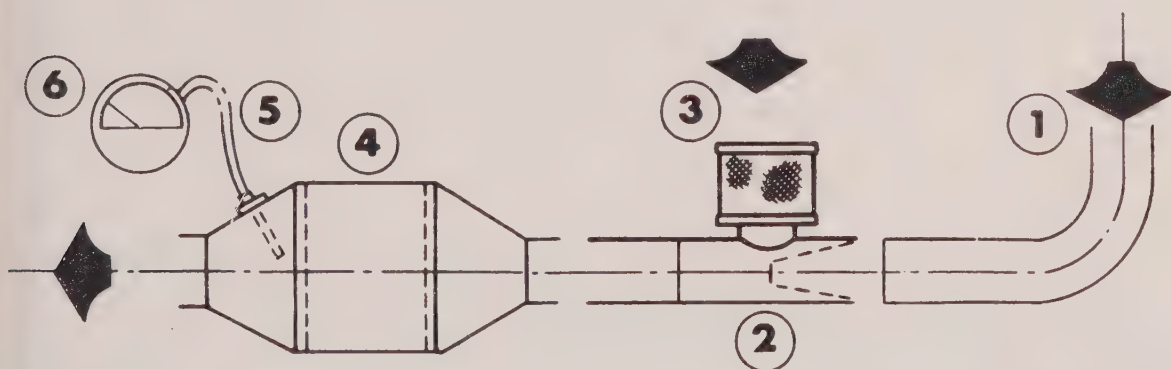


## Mains Voltage Frost Thermostat

From Honeywell's Residential Division comes the T403 frost thermostat. Based on the recently introduced T403 family of room thermostats it has a temperature range down to 30°F. and provides frost protection for domestic central heating installations.

## Catalytic Purifier for Internal Combustion Engines

The cost of indoor exhaust fumes can be counted in lowered efficiency, accidents, illness and product spoilage. It is far cheaper and safer to remove harmful carbon monoxide, hydrocarbons and odour-causing compounds at source. The Engelhard P.T.X. Purifier, with its specially developed platinum catalyst, oxidizes these impurities to harmless carbon dioxide and water vapour for many thousands of hours because it is not consumed in the reaction. Engelhard, who showed the purifier for the first time in the U.K. at last year's Clean Air Exhibition, claim that P.T.X. soon pays for itself.

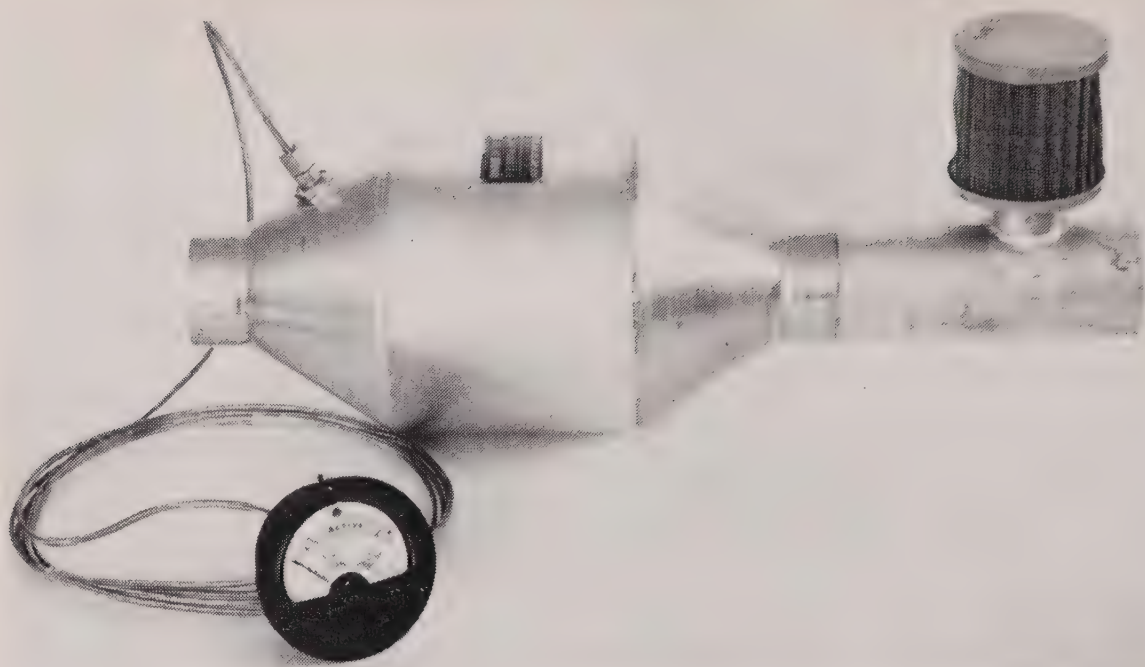


The P.T.X. Purifier works well on internal combustion engines using L.P.G., unleaded petrol and diesel fuel. It has a fast warm up, usually 30-45 seconds, and is therefore suitable for engines which are used intermittently, run at low speeds or left idling.

The unit is compact and easily fitted, and its dashboard-mounted dual scale pyrometer continuously watches engine efficiency as well as catalyst activity. It allows the engine to be kept in top tune at all times, with subsequent fuel savings as high as 35 per cent.

Tests with fork-lift trucks using L.P.G. fuel show that the P.T.X. Purifier cuts down carbon monoxide from 3.54 per cent to 0.006 per cent.

It works like this: engine exhaust containing carbon monoxide and other combustibles enters exhaust pipe (1) the gases pass through the venturi (2) and are mixed with air from the filter (3). Now mixed with air, the exhaust gases are burned in the P.T.X. catalyst chamber (4). The purifying oxidation generates additional heat which is sensed by the thermocouple (5) and pyrometer circuit (6) to monitor the reaction. At outlet, the exhaust gases have become harmless carbon dioxide and water vapour.



The Engelhard PTX Purifier

## **Wood-waste Fuel Boiler**

Until the development of the G.W.B. Vekos "Powermaster" Industrial Packaged Boiler for firing large quantities of wood waste, no successful fully automatic method of producing steam or hot water utilizing such material as a basic fuel was available.

After commissioning more than 20 boilers of varying capacities in single and multiple units in a variety of establishments the Vekos "Powermaster" has been launched with a full scale marketing operation.

## **Temperature Measurement Code**

The basic British Standard Code for temperature measurement, B.S. 1041 was first published in 1943. Continuing developments in apparatus and techniques for the measurement of temperature have resulted in subsequent changes to the standard, which is now published in several parts. A revision of Part 3 has recently been issued as—Industrial Resistance Thermometry. The aim of this part of the standard is to provide guidance on the principles and applications of resistance thermometry primarily in the sphere of plant instrumentation but, also for scientific and technological use in many other fields.

## **Chimney Lining In Situ**

The Rentokil Insuflu system is a novel way of forming flue linings in situ. It provides an insulated lining of circular cross-section for correct efficient combustion. It will maintain flue gas temperature at an optimum level whilst providing minimum resistance to gas flow. Insuflu can be used with any type of heating boiler including solid fuel and can be used in premises ranging from a private house to a factory.



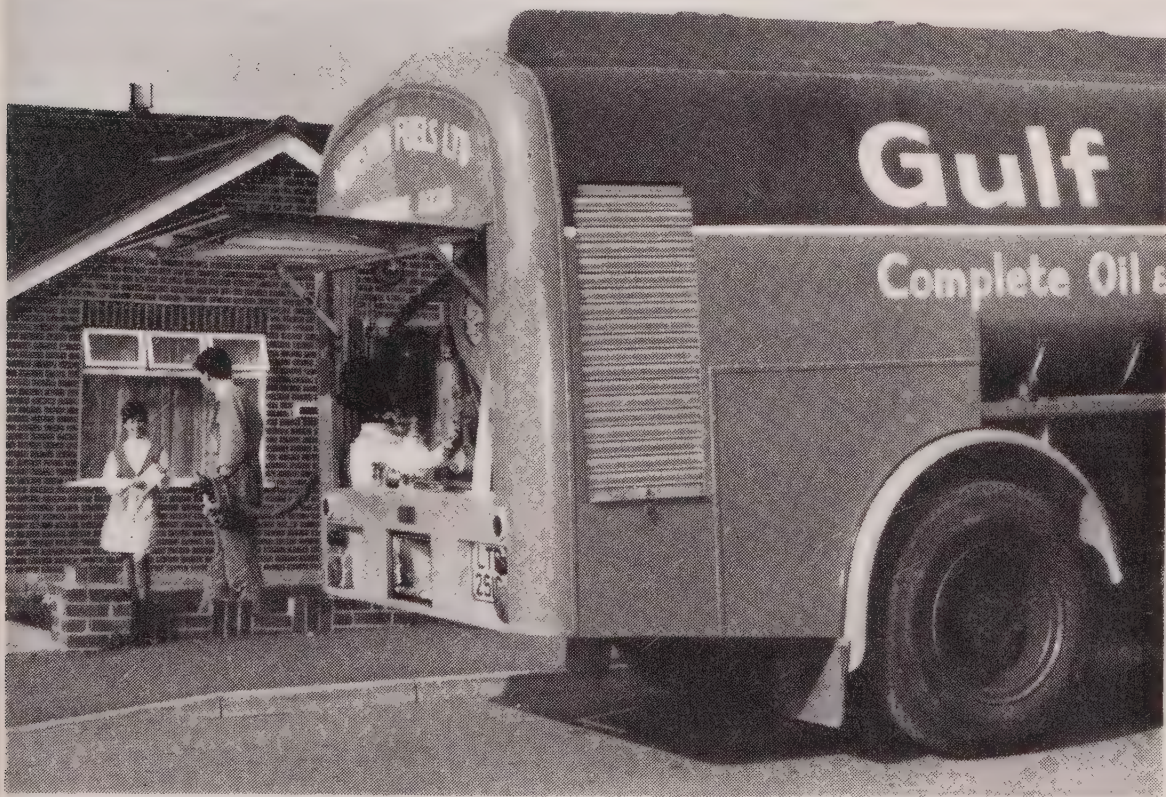
## Air Pollution Equipment Market

Frost & Sullivan, New York, announce the publication of a special 180 page report on the Air Pollution Equipment Market in the U.S.A.

The report charts this market during the next 5-10 years, and is designed to enable industrialists to create their own strategies for optimum participation. It includes a detailed projection of Federal expenditure to 1972 which is planned to be over 428 million dollars. The report is in two parts, "Instrumentation Requirements" and "Control Device Requirements", and is priced at 245 dollars.

## Reduced Price Installation Scheme for Oil-fired Central Heating

Announced recently by Minster Fuels Ltd. together with their fuel suppliers Gulf Oil (Great Britain) Ltd., an oil-fired central heating system that offers savings of up to 50 per cent on installation costs. An installation with a 60,000 B.T.U. oil fired boiler and central heating system will cost approximately £310, a reduction of £170, with no increase in the charge for fuel oil.



Minster Fuels' Metered Delivery



# COMPANY NEWS

## National Coal Board Research

Mr. Leslie Grainger, National Coal Board Member for Science in emphasizing the work on fluidized bed combustion, coking, coal blending and the development of coal chemicals now being pursued at the Board's Coal Research Establishment at Stoke Orchard, near Cheltenham, Gloucestershire suggested that Coal Industry scientists were leading the world in several important aspects of fuel technology.

Modern pulverized fuel generating stations, he said, are highly developed and offer little scope for cost reductions. By burning crushed coal in a fluidized bed, however, there is the possibility of cost savings through reduction in size and complexity. This is because both the combustion intensity and the rate of heat transfer can be greatly increased. Since the bed operates at much lower temperature for a given steam temperature, corrosion is expected also to be reduced. A further attractive feature is that the sulphur in the coal which is normally emitted in the off gases can be retained in the bed, thus reducing air pollution problems. In addition to being a basically much simpler system it is hoped it would be extremely flexible and easy to control. These features, together with the hoped for low capital costs would make the system very suitable for medium load factor operation.

The objective is to take advantage of the low cost coal which is expected to be available in the middle and late 1970s. A target capital cost of £50 per kW is being sought. If this can be achieved with coal at 3¼d. or 3½d. per therm, total generating costs on base load would be about 0.5d. per u.s.o. and competitive with other forms of generation. The work at Stoke Orchard is fully integrated with other versions of the fluidized combustion method recently displayed at the British Coal Utilization Research Association.

Following extensive basic studies, a rig capable of burning several hundred pounds of coal per hour has been constructed and very encouraging results are being obtained. The experimental work was supported by economic appraisals and conceptual studies being carried out by leading firms of consultants. If the results continue to be favourable a proposal for a prototype unit would be put forward for consideration in the late summer. Both manufacturers and potential users were very interested. Visitors from a number of countries, including the Continent and the U.S.A., have expressed great interest.

### *Coke*

The increase in the demand for steel was rapidly affecting the demand for coke in a world-wide pattern and the need to provide sufficient supplies of coking coal was becoming an urgent need especially for importing countries. This had added considerable emphasis to the work on coal blending in which Britain is more advanced than any other coal producing country. Japan, a major importer of coking coal, had been taking about 10 million tons of coal a year from both America and Australia and now had to look elsewhere for supplies. They were understood to be negotiating a contract for Russian coal.



As the internal demand for coking coal in America increased it affected the availability for export to Europe and her other markets. And as the prime coking coals became exhausted or more difficult to win there was a need, in coal producing countries, to seek methods of blending other coal to provide a high grade product. At Stoke Orchard, in co-operation with the British Coke Research Association, trials have been carried out on experimental ovens and have demonstrated that very good coke could be made if necessary without any prime coking coal and that this flexibility gave opportunity for economic advantage. Stoke Orchard are now studying the quality control problems, especially, and developing the techniques for each of the principal coal fields/steel works complexes.

So far this work had mainly been carried out in an empirical fashion but basic studies were now beginning to indicate the sort of components which might be expected to give satisfactory results when blended. These methods would greatly reduce the large scale experimentation required and might assist quality control. Specifications for coke were tending to become very rigorous and there appeared to be a distinct possibility that blending could be "tailor-made" to provide the specific properties needed in any particular blast furnace or cupola.

This work would ensure the supply of coking coal to the steel industry and foundry coke to the foundry industry. In addition it opened up prospects of a substantial export trade in coking coal.

## *Chemicals*

Traditionally, chemicals from coal have been made using the by products from coking as a starting point. The Board's policy has been to support this activity by developing methods for upgrading the value of these products, for example, by manufacturing phthalic anhydride from naphthalene.

This approach is limited by the extent of the coking industry. Work at Stoke Orchard is now proceeding on methods of making substances directly from coal. It is not expected that "oil from coal" processes will be economic in this country for a very long time, if ever. However, the initial stage of these processes consisting of attacking the coal with a solvent may be the starting point for cheap materials which could compete with plastics and other such materials. Already a number of products of this class have been marketed but the scope for widening the range of properties at low cost has recently been greatly increased.

## **Plans to Produce Natural Gas from Yorkshire Wells**

The Gas Council have announced plans covering the development of two natural gas wells at Lockton in Yorkshire by the Gas Council and Home Oil of Canada Limited.

Home Oil is seeking outline planning permission for the necessary equipment at the well heads and for a processing plant where the gas would be treated to make it suitable for public supply. The wells are located near Allerston and the processing plant is intended to be sited at Pickering.

## The Changing Pattern of Gas

Figures recently released by the Gas Council illustrate the growing importance to the gas industry of the cost reducing natural gas from the North Sea.

During the last three months of 1968 natural gas accounted for nearly 30 per cent of the total gas available compared with 16 per cent for the same period in 1967.

## APPOINTMENTS

### New General Manager for the Incinerator Co. Ltd.

Mr. S. K. W. Dunn, A.M.INST.F. has been appointed as a Director and General Manager of The Incinerator Co. Ltd., London. Formerly a Director of Robey & Co. Ltd. of Lincoln, Mr. Dunn who is a Chartered Fuel Technologist has had wide experience of combustion practice in the industrial field.

### Pfizer Chairman for Calor Gas

Mr. P. V. Colebrook, Chairman since 1961 of the Pfizer Group in Great Britain has been appointed Managing Director of Calor Gas (Holding) now part of Imperial Continental Gas Association.

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## SMOKE CONTROL AREAS

### Progress Report

Position at 31 March 1969—TOTALS

*(Figures supplied by Ministry of Housing and Local Government)*

	England	Wales	Scotland	Northern Ireland
Smokeless Zones (Local Acts) in Operation ..	44	—	1	—
Acres, 3,400 .. ..				
Premises, 41,060 ..				
Smoke Control Areas in Operation .. ..	2,719	6	122	13
Acres .. .. .	686,991	418	66,236	5,618
Premises .. ..	3,632,844	2,352	311,385	4,791
Smoke Control Orders				
Confirmed .. ..	295	1	20	2
Submitted .. ..	67	—	4	2
Grand Totals ..	3,125	7	147	17



**Smoke Control Position in Regions of England  
at 31 March 1969**  
(Figures supplied by Ministry of Housing and Local Government)

(1)  Region	(2) No. of black area acres covered by smoke control orders con- firmed or awaiting decision	(3) Percentage* of total black area acreage in region so covered	(4) No. of black area premises covered by smoke control orders confirmed or awaiting decision	(5) Percentage* of total black area premises in the region
Northern .. ..	26,516	21.16	128,710	23.28
Yorkshire and Humberside ..	157,782	41.90	523,966	44.86
East Midlands ..	51,848	19.32	161,987	31.65
Greater London ..	219,698	67.18	1,956,437	74.12
North Western ..	162,139	40.41	711,608	41.79
West Midlands ..	76,616	30.77	338,505	32.19
South Western ..	7,201	27.33	26,650	17.89
Total (black areas)	701,800	39.56	3,847,863	49.49
Outside black areas	129,126		422,183	
<b>GRAND TOTALS</b>	830,926		4,270,046	

\* The percentage shown in columns (3) and (5) above are percentages of the *total* acreage and of the *total* number of premises in the black areas concerned. In practice it may not always be necessary for the whole of the black area authority's district to be covered by smoke control orders (e.g. there may be some areas of open country).  
NOTE.—Statistics in respect of Wales and Monmouthshire are no longer included.

## NEW SMOKE CONTROL ORDERS

The lists below are supplementary to the information in the last issue of *Smokeless Air* (Spring 1969) which gave the position up to 31 December, 1968. They now show changes and additions up to 31 March, 1969.

Some of the areas listed are new housing estates, or areas to be developed for housing. The total number of premises involved will therefore increase. An asterisk denotes that there have been objections and that a formal inquiry has been or will be held.

The list of new areas in operation of smoke control is based on the plans submitted to the Ministry of Housing, but may erroneously include some local authorities who have made postponements, without notifying the Ministry of the fact.

### ENGLAND NEW SMOKE CONTROL ORDERS IN OPERATION

#### Northern

Tyneside and Wearside  
Longbenton U.D. No. 2.

#### Yorkshire

West Riding (North)  
Horsforth U.D. No. 27.  
West Riding (South)  
Barnsley C.B. Nos. 6 and 7.

#### Midlands

Derby, Nottingham and Chesterfield  
Alfreton U.D. No. 2.  
West Midlands

Birmingham C.B. Nos. 152–155.

#### Local Authorities Outside the Black Areas

Ripley U.D. No. 1. Whiston R.D. No. 2.

## NEW SMOKE CONTROL ORDERS CONFIRMED BUT NOT YET IN OPERATION

### Northern

#### *Tyneside and Wearside*

Boldon U.D. Nos. 9 and 13. Hebburn U.D. No. 11. Tynemouth C.B. No. 8. Whickham U.D. No. 8.

#### *Teeside*

Teeside C.B. Nos. 2 and 3.

### Yorkshire

#### *West Riding (North)*

Aireborough U.D. No. 25. Bingley U.D. No. 16. Horsforth U.D. No. 28. Leeds C.B. Nos. 74 and 75. Mirfield U.D. No. 10. Pudsey B. No. 8. Sowerby Bridge U.D. No. 7. Spenborough B. No. 10. Stanley U.D. (South Stanley No. 2). Stanley U.D. No. 3.

#### *West Riding (South)*

Dearne U.D. No. 3. Doncaster C.B. No. 11. Mexborough U.D. No. 2. Sheffield C.B. No. 24. Wombwell U.D. No. 2.

### North Western

#### *South Lancashire and North-East Cheshire*

Ashton-under-Lyne B. No. 9. Atherton U.D. No. 5. Droylsden U.D. No. 13. Eccles B. Nos. 10 and 11. Failsworth U.D. No. 8. Kearsley U.D. No. 3. Manchester C.B. (Blackley) Radcliffe B. No. 5. Royton U.D. No. 5. Stockport C.B. Brinnington. Stretford B. No. 13. Wigan C.B. No. 6. Worsley U.D. No. 7.

#### *Central Lancashire*

Barrowford U.D. No. 2. Brierfield U.D. No. 4. Colne B. No. 7. Darwen B. No. 4. Great Harwood U.D. No. 1.

#### *Merseyside*

Ellesmere Port B. No. 9. Litherland U.D. No. 2. St. Helens C.B. No. 6A. Wallasey C.B. No. 14.

### Midlands

#### *Derby, Nottingham and Chesterfield*

Beeston and Stapleford U.D. No. 10. Carlton U.D. No. 5. Derby C.B. No. 18. Ilkeston B. Nos. 3 and 4. Mansfield Woodhouse U.D. No. 2.

#### *North Midlands*

Leicester C.B. Nos. 25 and 26.

#### *West Midlands*

Aldridge-Brownhills U.D. No. 29. Bedworth U.D. No. 3. Nuneaton B. No. 6. Solihull C.B. No. 16. Sutton Coldfield B. No. 13. Warley C.B. Nos. 4-8.

#### *Potteries*

Newcastle-under-Lyne B. No. 8.

### London

#### *Greater London Boroughs*

Barnet L.B. No. 9. Ealing L.B. Nos. 41 and 42. Harrow L.B. No. 19. Hillingdon L.B. No. 12. Hounslow L.B. Feltham No. 9. Hounslow L.B. Brentford and Chiswick No. 10. Hounslow L.B. Heston and Isleworth No. 13. Hounslow L.B. Heston and Isleworth Nos. 35 and 36. Newham L.B. No. 6. Redbridge L.B. No. 15. Richmond-upon-Thames L.B. (Barnes No. 10). Richmond-upon-Thames L.B. (Twickenham No. 8). Southwark L.B. No. 25. Sutton L.B. No. 19. Waltham Forest L.B. No. 15.

#### *Outer London*

Dartford R.D. Swanley (East and Central).

### Local Authorities Outside the Black Areas

Canterbury C.B. No. 3. Cheltenham B. No. 5. \*Corby U.D. No. 2. Easthamstead R.D. No. 1. Glossop B. No. 3. Grantham B. Nos. 15 and 16. Hale U.D. No. 2. Heanor U.D. No. 3. Lancaster C.B. Nos. 5 and 6. Lincoln C.B. No. 2. Luton C.B. No. 7. Potters Bar U.D. No. 3. Reading C.B. No. 13. Rugby B. No. 11. Runcorn R.D. No. 3. Skelmersdale and Holland U.D. Nos. 4 and 5. Staines U.D. No. 10. Stanley (Shield Row No. 1) U.D. (Durham). Tamworth B. No. 3. Watford B. Harwoods No. 6. York C.B. No. 1.

## NEW SMOKE CONTROL ORDERS SUBMITTED BUT NOT YET CONFIRMED

### Northern

#### *Tyneside and Wearside*

Boldon U.D. Nos. 14 and 15.

#### *Teeside*

Hartlepool C.B. No. 15.

### Yorkshire

#### *West Riding (North)*

Baildon U.D. No. 11. Elland U.D. West Vale. Halifax C.B. No. 16. Leeds C.B. Nos. 76 and 77. Rothwell U.D. No. 13. Wakefield C.B. (St. John's No. 1). Wakefield C.B. (St. John's No. 3).

#### *West Riding (South)*

Dearne U.D. No. 5.

### North Western

#### *South Lancashire and North-East Cheshire*

Dukinfield B. No. 15. Farnworth B. No. 4. Heywood B. No. 9. Irlam U.D. No. 4. Leigh B. No. 10. Middleton B. Nos. 15 and 16. Stockport C.B. (Adswold, Davenport). Tottington U.D. No. 2. Urmston U.D. No. 9. Westhoughton U.D. No. 5.



*Central Lancashire*

Rishton U.D. Nos. 2 and 3.

*Merseyside*

Bebington B. No. 13. Birkenhead C.B. No. 10.

**Midlands**

*Derby, Nottingham and Chesterfield*

Hucknall U.D. No. 3.

*West Midlands*

Birmingham C.B. No. 156. Dudley C.B. Nos. 55-57. Sutton Coldfield B. No. 15.

*Potteries*

Stoke-on-Trent C.B. No. 23.

**London**

*Greater London Boroughs*

Croydon L.B. No. 11. Ealing L.B. Nos. 43-45. Enfield L.B. No. 17. Havering L.B. No. 5. Merton L.B. No. 13. Richmond-upon-Thames L.B. (Richmond No. 10). Sutton L.B. No. 20. Wandsworth L.B. No. 3.

**Local Authorities Outside the Black Areas**

Blackburn R.D. No. 2. Flaxton R.D. Nos. 1-3. Grantham B. Nos. 17 and 18. Marple U.D. No. 2. New Windsor R.B. No. 1. Rugby B. No. 10. Scunthorpe B. No. 8. Slough B. No. 13. Whiston R.D. No. 3.

**SCOTLAND**

**NEW SMOKE CONTROL ORDER  
IN OPERATION**

Barrhead No. 3. (Waulkmill).

**NEW SMOKE CONTROL ORDERS  
CONFIRMED BUT NOT YET IN  
OPERATION**

Bearsden (Westerton). Coatbridge (Cliftonville). Fife County (Dalgety Bay). Galashields (Wood St./Fifth Ward). Johnstone No. 1. Port Glasgow No. 4. Renfrew Burgh No. 5.

**NEW SMOKE CONTROL ORDER  
SUBMITTED BUT NOT YET  
CONFIRMED**

Dumbarton Burgh No. 9.

**NORTHERN IRELAND NEW SMOKE  
CONTROL ORDERS IN OPERATION**

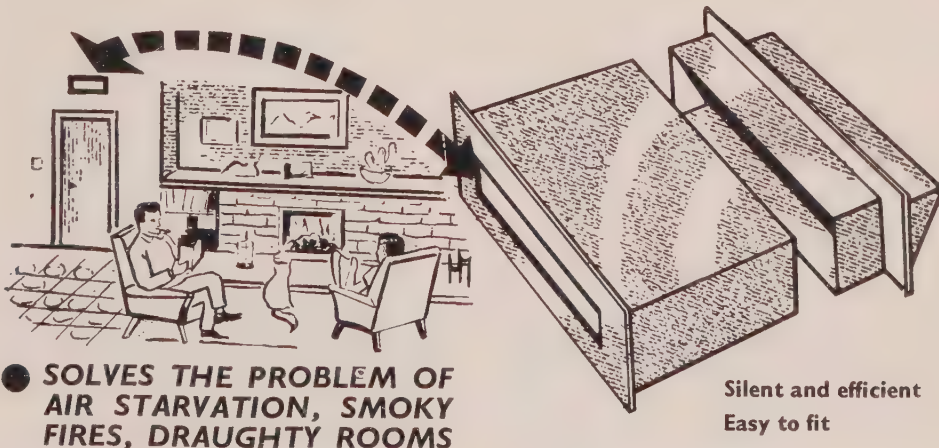
Belfast C.B. No. 1. Castlereagh R.D. No. 2. Hillsborough R.D. No. 1. Portadown B. No. 2.

**NEW SMOKE CONTROL ORDER  
CONFIRMED BUT NOT YET IN  
OPERATION**

Belfast C.B. No. 2.

**NEW SMOKE CONTROL ORDERS  
SUBMITTED BUT NOT YET  
CONFIRMED**

Downpatrick U.D. No. 1. Holywood U.D. No. 3.



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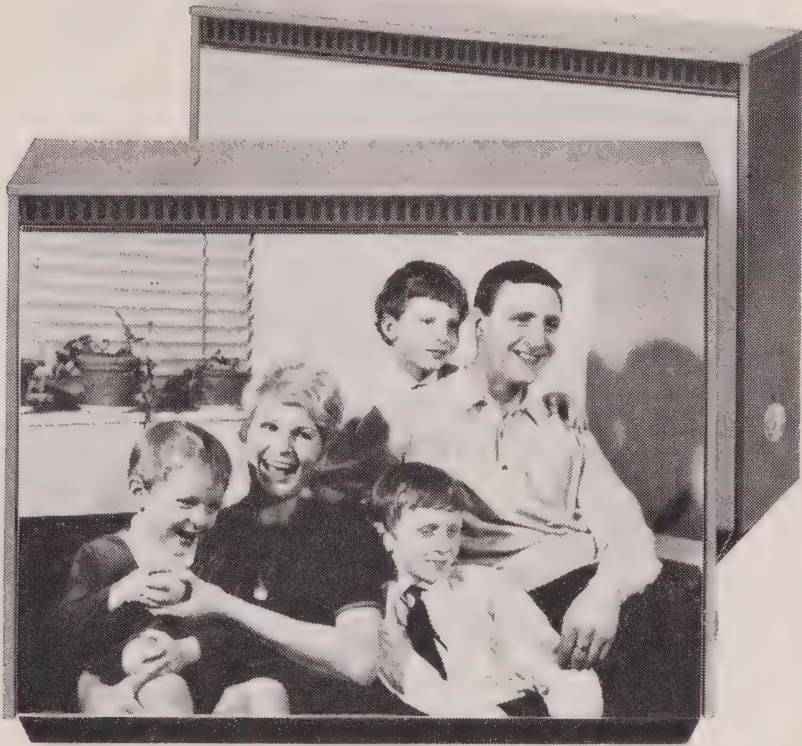
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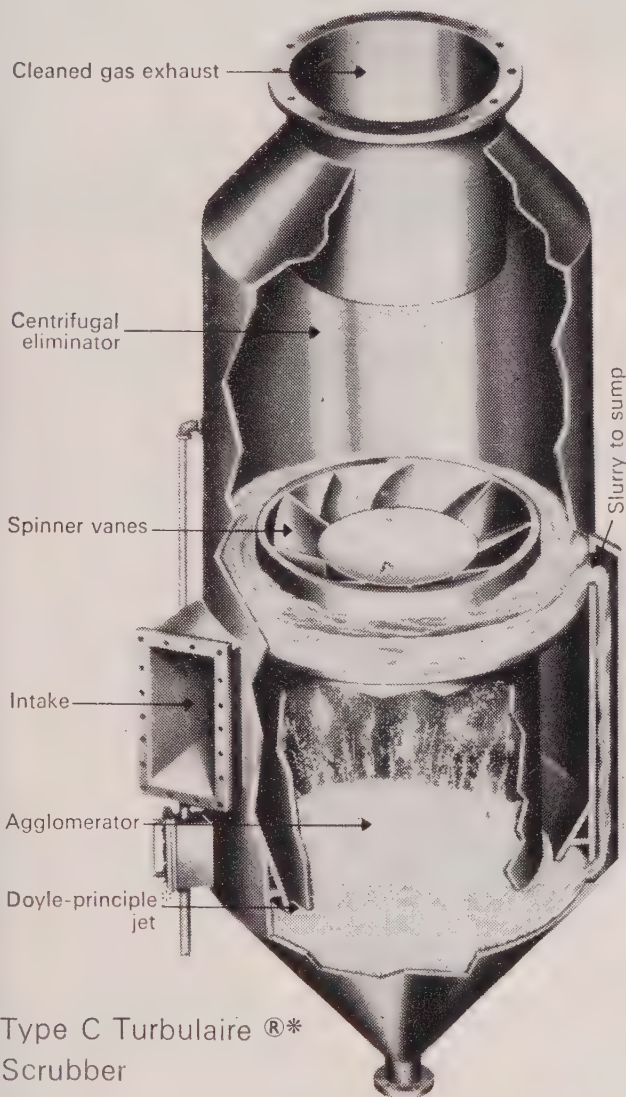


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The Type C Turbulaire<sup>®\*</sup> Scrubber



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- 2 Trouble-free—no moving parts to wear out, no spray nozzles to clog.
- 3 Positive hopper agitation keeps slurry in suspension at up to 50% concentration.
- 4 Wide open design eliminates plugging—cleans gases containing over 20 grs/cf of dust without need for pre-cleaners.
- 5 Pressure drop and efficiency custom engineered to meet each individual application.
- 6 Simple field modification adapts unit to maintain constant efficiency at varying volumes.
- 7 Can be furnished in a variety of materials for corrosion resistance, etc.
- 8 Three space-saving configurations; same principle, same efficiency.
- 9 Low wet-zone velocities eliminate attack by abrasive slurries.
- 10 Delivers cleaned, cooled gas to stack or process.

\* U.S. Patents 2,621,754 and 2,720,280



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# Information available for clean air campaigns



## EXHIBITION

A complete pre-fabricated and self-contained "Clean Air" Exhibition: adaptable in size with one, two, three or four approved smokeless appliances under fire, and displays of the smokeless fuels available in the district

## MOBILE UNITS

Manned with technical demonstrators, to advise and help residents in proposed or newly-formed Smoke Control Areas. They incorporate approved appliances under fire and a display of the solid smokeless fuels

## DISPLAYS

A range of portable units variously displaying instructional panels dealing with Clean Air and the Act, a typical central heating unit, fuel displays and literature displays

## LITERATURE

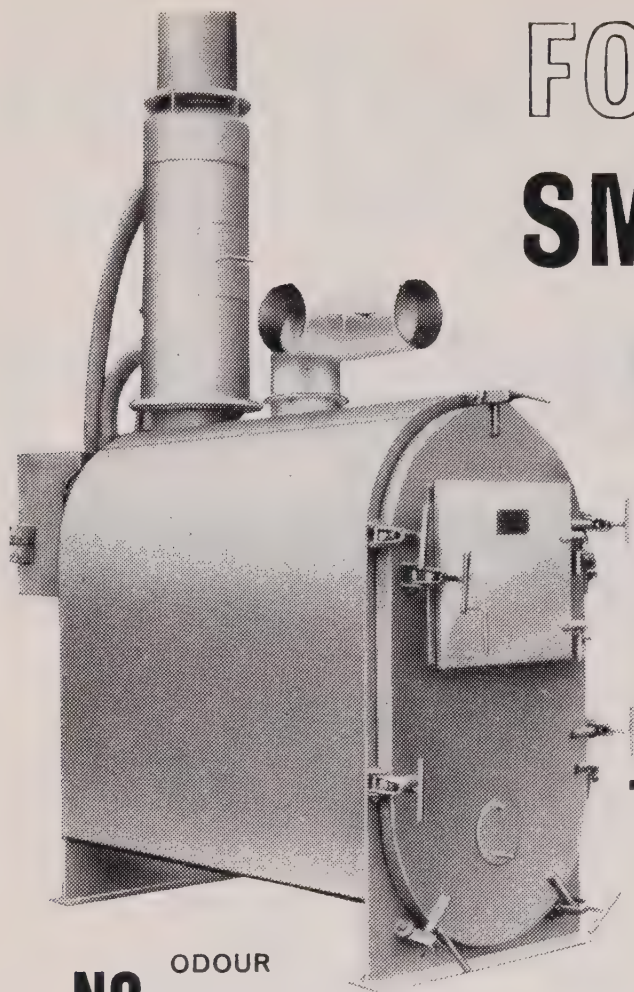
Informative literature is available free to Local Authorities explaining the Clean Air Act, and giving full information on solid smokeless fuels and the appliances

The comprehensive services offered free by the Solid Smokeless Fuels Federation can make an invaluable contribution to "Clean Air" campaigns, the implementation of Smoke Control Areas, and the organization of House Improvement or Conversion schemes. Local Authorities who are interested in utilizing the aids shown above are invited to apply to:

**SOLID SMOKELESS FUELS FEDERATION**

York House, Empire Way, Wembley, Middlesex

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- \* **Guaranteed**, after loading and during incineration of *any* materials, to fully meet the smokeless requirements of the **Clean Air Acts** and Local Authority Regulations.

*IMPORTANT. When purchasing any Incinerator, never rely upon advertised claims of smokelessness. Always insist upon a written guarantee that it will be completely smokeless with any type of refuse.*

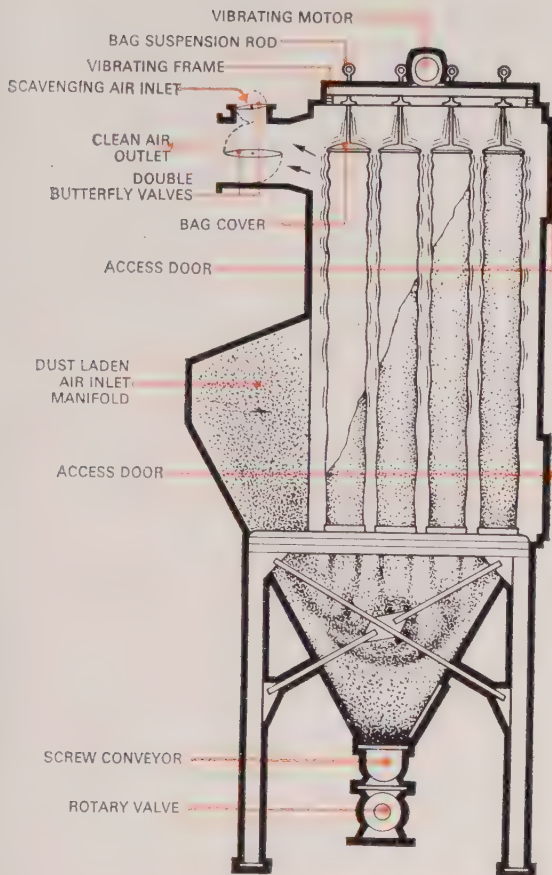
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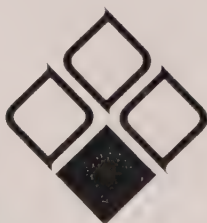
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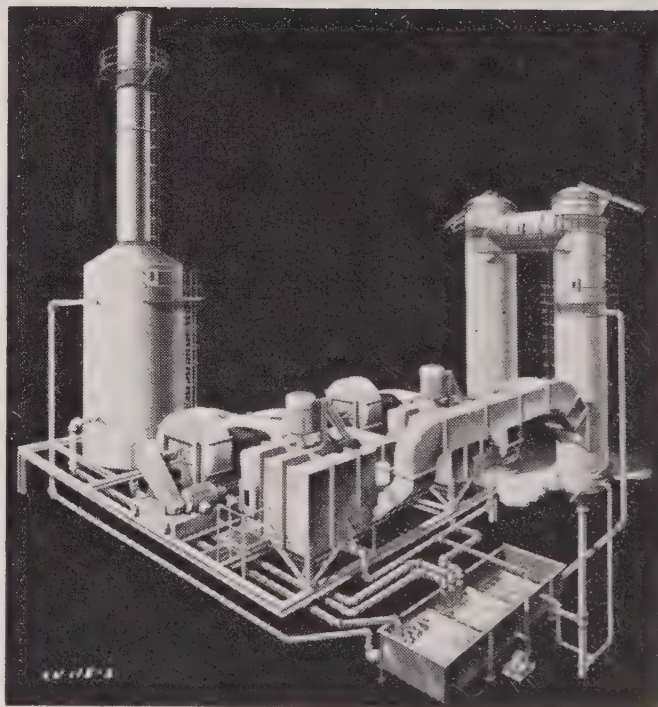
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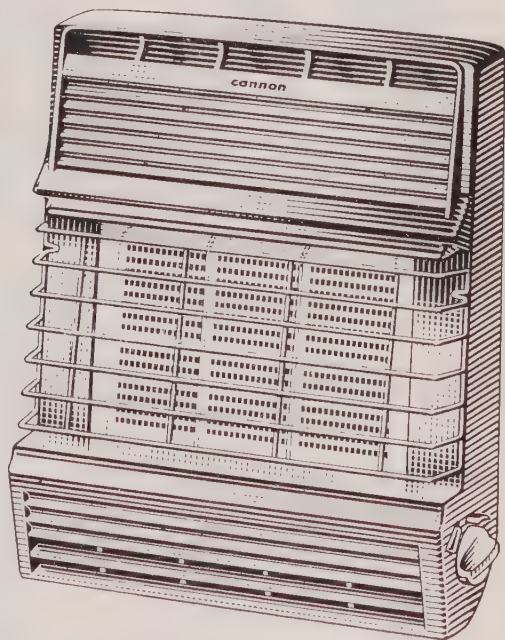
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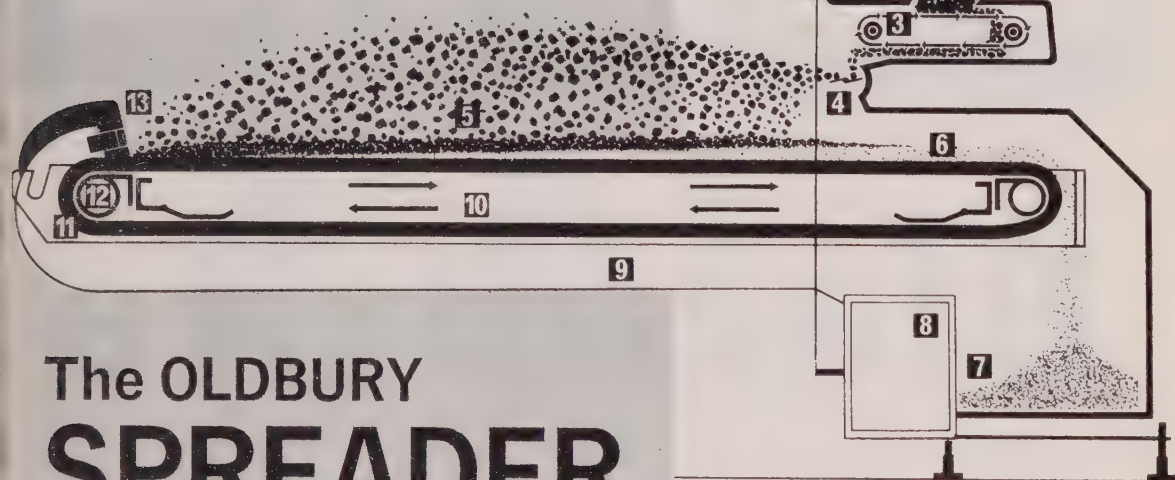
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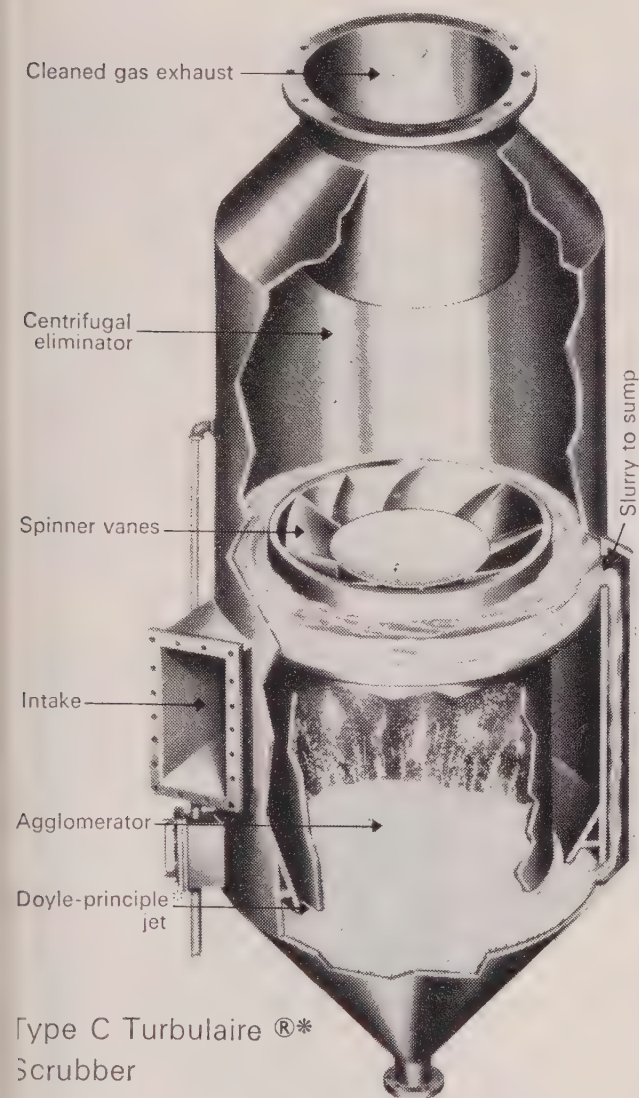
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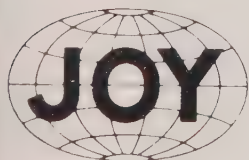
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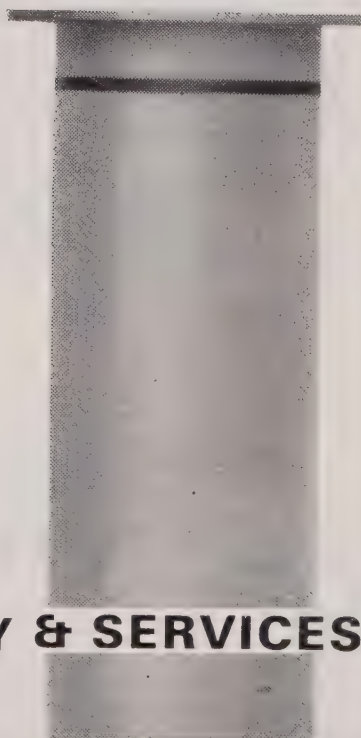
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# SMOKELESS AIR

Vol. XL No. 151

Autumn 1969

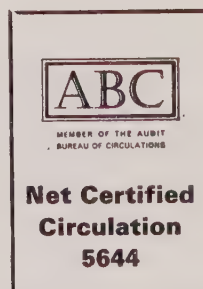
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SMOKELESS AIR is published quarterly by the National Society for Clean Air at Field House, Brems Buildings, London, E.C.4. Tel.: 01-242 5038 (Editorial and Advertising). Editor: Rear-Admiral P. G. Sharp; Assistant Editors: V. Finlay, A. A. Mister. Issued gratis to Members and Representatives of Members. Subscriptions rate for SMOKELESS AIR only £1 per annum, post free. SMOKELESS AIR is the official organ of the Society, but the views expressed in contributed articles are not necessarily endorsed by the Society. Abstraction and quotation of matter are permitted, except where stated, provided that due acknowledgements, including the name and address of the Society, are made. Technical articles of full page length, or over, in SMOKELESS AIR are indexed in British Technology Index.







*Ship, towers, domes, theatres and temples lie  
Open unto the fields, and to the sky:  
All bright and glittering in the smokeless air*

# SMOKELESS AIR

## Pollution from Road Vehicles

Later in this issue we publish two verbatim reports from *Hansard* of discussions in the House of Lords and House of Commons regarding motor vehicle exhaust gases, and it is very gratifying to know that these matters were raised. However, as can be seen the outcome of the discussion was inconclusive. That was on 14 May. On 25 July, the Senate of the State of California approved a Bill to ban the internal combustion engine in California by 1 January, 1975. And in Australia, the Commonwealth Bureau of Roads reported to the Senate Select Committee on Air Pollution that pollution from road vehicles may be killing 660 Australians each year.

While we may not have such a large motor vehicle population in this country as they do in the United States, the density is actually greater. And although we are not troubled by photochemical smog, there is no doubt that in a hot summer such as we have enjoyed this year, the pollution from road vehicles is becoming insufferable in our crowded city streets. It is all very well for the Ministry of Transport to state that medical research has failed to show any ill effects from the levels of carbon monoxide experienced in city streets in this country. Medical evidence and medical opinion frequently conflict. The report given to the Australian Senate Committee would seem to bear this out. Have we got to wait until it is proved to the satisfaction of the Ministry of Transport that someone has actually died or become ill as a result of pollution from road vehicles before any action is taken? It is to be hoped that the talks with other European countries aimed at drawing up a standard for emissions from petrol engines will soon reach a successful conclusion and that the much-needed legislative action is taken.

Meanwhile, in the United States, the battle regarding the vehicle of the future continues. There is no doubt that in the United States the steam car is taken seriously and for good technical reasons. Ford's name, for example, has recently been coupled with a contract placed by the United States Department of Health, Education and Welfare, for the complete design of a steam engine to power a family car. General Motors, who have made some well publicized attempts to

show that the steam car is simply not on, and who have recently announced a new ignition system which they claim substantially reduces exhaust fumes from internal combustion engined vehicles, have admitted they prefer steam to electro-technology.

We shall have to wait and see what actually happens in California by 1975. Perhaps steam cars will be running on the roads of the Golden State by that time. Our main concern, however, is whether any action will have been taken in this country by that time.

## Second International Conference, Washington, December 1970

Full details of the Second International Conference which will be held at the Sheraton Park Hotel, Washington D.C., U.S.A. from the 6-11 December, 1970 are given in the International News Section of this issue. The Papers Sub-Committee of the Society is now busy collecting offers of papers from would-be authors. If you would like to present a paper—and we hope that many will—at this Conference please submit details to the Director as soon as possible, and not later than 31 October, 1969.

## A Lead from the Prince of Wales

At a recent reception held at St. James's Palace by the London Welsh Association the Prince of Wales said "We are hearing a great deal about our environment and pollution nowadays, particularly in the newspapers, but already it is almost too late.

"The tragic thing about our relationship with nature is that we sit up and take notice only when things are in imminent danger of extinction through our own agency." The Prince continued that the air was clogged with every sort of industrial excretion. He expressed the wish "that something should be done".

## Cleaner Halifax

In our last number we pointed out that the Polar Bears at the London Zoo were now whiter in colour than ten years ago. A report from Halifax indicates that it has no Polar Bears for comparison, but there is plenty of evidence of the benefits of cleaner air. For example, a housewife recently testified that she has now much less work to do than she had ten years ago. There really is less grit in the dust. It was not so long ago that white paint would not have been used in Halifax for economic reasons, but paint work now does not soil so readily, and so if one now looks round Halifax one sees a profusion of white paint, and clean white paint at that. The report, from the *Halifax Evening Courier and Guardian* states that doubtless some of the credit should go to the improvement in paint quality, but it does reflect a marked change of attitude to desirabilities in brightness and a greater confidence in what can be safely indulged in—due to cleaner air.



## Mrs. Marsh Writes

"I would like to thank all those organizations and individuals who sent their sympathy to me on the death of my husband—through the Society. Also, I would thank all those kind members and friends who wrote to me personally and to whom I may not have replied.

"The cause of clean air was and still is an absorbing interest. It enriched my married life and through my husband I met so many kind, interesting and dedicated people. I look back on the years with gratitude.

"Although my husband's retirement was so very short, he was, until his illness very happy and we had one splendid holiday in Italy last summer made all the more enjoyable and carefree by the generosity of those who contributed to his retirement fund."

## Environmental Pollution

Mrs. Joyce Butler and Mr. Dalyell recently asked the Prime Minister, in the House, if he would appoint an inter-departmental council with additional scientific representatives to co-ordinate the attack on environmental pollution. In a written answer the Prime Minister stated that the Government were fully aware of the importance and urgency of this problem, and the need to co-ordinate, in the most effective way possible all measures of control of environmental pollution. He added that the problem was already under close inter-departmental investigation and has recently been considered by the Central Advisory Council for Science and Technology.

## America seeks help on Pollution Control

In a recent news bulletin, the United Kingdom Scientific Mission in Washington report that Britain was cited as an example of a crowded country which had brought pollution well under control. American Senators who visited this country returned to America with enthusiastic reports of what was being achieved. Naturally, some of these referred to efforts being made to keep water pollution at bay, but others pointed out that American legislators and scientists had been greatly impressed by the reduction in air pollution in London since the passing of the Clean Air Act. This is certainly gratifying, but it does not mean that in any way we can relax our efforts. The report from America certainly does not point out that we have taken any very active steps to reduce pollution from road vehicles!

## The Price of *Smokeless Air*

We have heard a lot recently about the cost of air pollution and indeed later in this issue mention is made of the discussion in the report by the Chief Alkali Inspector on the cost of controlling air pollution. Like every other cost, the cost of the control of air pollution is rising. So, regrettably is the cost of *Smokeless Air*. As from this issue the price will be 5s.

# Pollution from Road Vehicles

## Questions in the Lords

The following extract from *Hansard* reporting a discussion in the House of Lords on 14 May last will be of interest to all concerned in this problem.

### HOUSE OF LORDS

*Wednesday, 14th May, 1969*

#### MOTOR VEHICLE EXHAUST GASES

2.35 p.m.

LORD BROOKE OF CUMNOR: My Lords, I beg leave to ask the first Question which stands in my name on the Order Paper.

[The Question was as follows:

To ask Her Majesty's Government whether they are aware that foreign manufacturers of cars and other petrol-engined road vehicles are designing them so as greatly to reduce, if not to eliminate, the pollution of the air by carbon monoxide and other colourless exhaust gases; and when they intend to amend the Motor Vehicles (Construction and Use) Regulations to ensure that all such vehicles manufactured in this country in future will be similarly inoffensive in that respect.]

THE JOINT PARLIAMENTARY UNDER-SECRETARY OF STATE FOR SCOTLAND (LORD HUGHES): My Lords, the Ministry of Transport are co-operating with other European countries in drawing up a standard for emissions from petrol engines. I would point out that medical research has failed to show any ill-effects from the levels of carbon monoxide experienced in city streets in this country, and other colourless exhaust gases are offensive only by reason of their smell.

LORD BROOKE OF CUMNOR: My Lords, I am most grateful to the noble Lord for taking time off from his Scottish duties to answer this Question. Is he aware that the medical research that has been conducted does not appear to have extended to concentrations of vehicles for long periods in traffic jams, where of course the pollution is greatest? Is he also aware that a considerable improvement in the exhaust situation could be achieved, at low cost, by carburettor adjustment, and that that would effect a saving in fuel consumption?

LORD HUGHES: My Lords, the noble Lord's first supplementary question was whether I was aware of the effect in congested city streets. The assumption in the question is wrong. Research has been made in that field also, and the answer which I have given in relation to carbon monoxide applies there also. So far as the second part of the question is concerned, about the use of devices, I may say that this is the sort of thing which is being investigated, and I would point out that what the Americans are requiring in their 1970 regulations is different. In cars which are being exported to America we are already conforming to the American requirements. If we adopt this other system we should be in the dangerous position of having two completely different systems for



dealing with the same problem. I think, therefore, that it would be better that we should wait and see what recommendations emerge from the Working Party, and find out whether it is possible to do something which would meet European and American requirements with the same devices.

EARL HOWE: My Lords, is the noble Lord also aware that the automatic gearbox, due to its transmission drag, results in better burning of the fuel at idling speeds. Many people in this country still prefer a manual box, but it is difficult for a manual gearbox to attain these standards. I wonder whether that point has been considered.

LORD HUGHES: My Lords, I would suggest that that must depend also on individual taste. I believe that nowadays more people are driving with automatic gearboxes. I do so myself, just because I happen to prefer it. This use will grow, or otherwise, according to public demand.

BARONESS SUMMERSKILL: My Lords, may I ask my noble friend whether he is aware that over the years, Members have been assured from both sides of the Despatch Box that there is no danger from inhaling certain toxic substances, including tobacco? But over the years those spokesmen have changed their minds. Would he bear that in mind in relation to this question?

LORD HUGHES: My Lords, I have realized that Ministers at their peril fail to bear in mind anything that my noble friend says. I will certainly bear in mind what she says.

LORD GIFFORD: My Lords, is this not a question not only of risks to health but of the quality of life in our cities and crowded streets? Will not the Government look most seriously at all possible suggestions for reducing pollution in this way?

LORD HUGHES: Yes, my Lords. But what the Government and the public have to balance up at the end of the day is what they are prepared to pay for improving the quality of life.

LORD BROOKE OF CUMNOR: My Lords, will the Government press on with the study of this problem and report to Parliament as soon as they can what conclusions are reached by this international study?

LORD HUGHES: My Lords, I think the results of the international study are expected shortly. I will draw the attention of my right honourable friend to the noble Lord's request that these should be made public.

LORD BROOKE OF CUMNOR: My Lords, I beg leave to ask the second Question which stands in my name on the Order Paper.

[The Question was as follows:

To ask Her Majesty's Government whether they are aware that diesel-engined vehicles can still frequently be seen on the roads polluting the air with dark smoke; and what further action they propose to take to stop this nuisance effectively.]

LORD HUGHES: My Lords, these are mainly overloaded or badly maintained goods vehicles. My right honourable friend the Minister of Transport has set up plating and testing arrangements to stop overloading and to improve maintenance standards.

LORD BROOKE OF CUMNOR: My Lords, I am most grateful also for that Answer. Is the noble Lord aware that independent experts are critical of the recent B.S.I. specification for diesel-engined vehicles and consider that it is not tight enough, and that an effective way of really getting rid of the dark smoke from diesel vehicles would be to tighten up the specification, and also to have more inspectors to enforce the regulations?

LORD HUGHES: Well, my Lords, this again is a question of where the balance of advantage lies. Noble Lords are constantly pressing the Government to have fewer civil servants and yet finding reasons for employing more civil servants. It is most difficult to get these sums to equate. I would point out, however, that manufacturers have

agreed to implement a British standard which will minimize still further smoke emission from new diesel-engined vehicles, and given proper maintenance by the operator we should then have a completely satisfactory result.

So far as the use of additional inspectors is concerned, there will be the annual check under the new system, apart from the occasional roadside checks. There are several thousand prosecutions each year. We do not want too many prosecutions, and the whole purpose of this machinery is to get people to do the job properly and make certain that we do not need to have prosecutions. We think that the improvement in the new arrangements, the new equipment which manufacturers are putting on new vehicles, together with these roadside checks, should all combine to produce a still more satisfactory state of affairs in future.

**LORD NUGENT OF GUILDFORD:** My Lords, is the noble Lord aware that the roadside checks have a considerable value in reducing this unpleasant and dangerous emission of black smoke? Could the Ministry of Transport, in co-operation with the Home Secretary, ask all chief constables throughout the country to institute a campaign, say over one month during the year, so that these checks are generally applied throughout the country? Experience has shown that this is the best method of catching the bad operators in this particular field. Is the noble Lord aware that this was done about ten years ago, very successfully, and that it might well be repeated?

**LORD HUGHES:** My Lords, I think the suggestion made by the noble Lord, Lord Nugent of Guildford, is a useful one, and I shall be very happy to bring it to the attention of my right honourable friend.

**LORD VIVIAN:** My Lords, the noble Lord has said that this dark smoke emanating from vehicles is chiefly due to overloading, but does he appreciate

that I, and I am sure several other noble Lords also, have driven behind such vehicles which are diesel-powered when they are completely empty and emitting an appalling amount of smoke?

**LORD HUGHES:** My Lords, I think perhaps the noble Lord missed the last few words of my Answer, and I will repeat it. I said, "to stop overloading and to improve maintenance standards". The emission of smoke can be caused by one or other or both; overloading or bad maintenance.

**LORD VIVIAN:** I apologize, my Lords.

**LORD RAGLAN:** My Lords, would not the simple remedy for this problem be to see that the lorries discharge their exhaust vertically into the air, instead of horizontally along the ground?

**LORD HUGHES:** My Lords, I seem to have heard that question before, and I believe that the answer is that things which are heavier than air tend to fall down anyway.

**LORD RAGLAN:** My Lords, does not my noble friend agree that that answer—which indeed has been given before in this House—seems to many noble Lords not to be common sense? It is surely better that the exhaust should be driven up into the air instead of along the ground where eventually it finds its way into the air. Does not my noble friend agree that sending it up into the air is better than letting it run along the ground?

**LORD HUGHES:** My Lords, if one were quite certain that it was going to run along the ground, there would be no need to worry about it, unless one was in the habit of lying on the ground. If one was equally certain that if it was sent up in the air it was going to stay up in the air, again one need not worry about it unless one was about ten feet tall. Most of us are between these two extremes, and it is in an attempt to deal with that situation that we are trying to find an answer.

**LORD TREFGARNE:** My Lords, can the noble Lord confirm that the



annual checks to which he referred will include a measurement of the amount of smoke issued by the particular vehicles?

LORD HUGHES: My Lords, that is what I understand.

EARL HOWE: My Lords, is the noble Lord aware that in some States in America the State laws require exhaust gases of diesel-engined vehicles to be discharged above cab level, and that in South Africa they are experimenting on the same basis? I wonder whether we could not learn something

from these experiments in South Africa and the United States.

LORD HUGHES: My Lords, I have no doubt that we could learn many things from both South Africa and the United States of America. Whether they are all advantageous, I should not care to speculate.

LORD CLIFFORD OF CHUD-LEIGH: My Lords, is it not a fact that the use of platinum as a catalyst is the answer to both these problems?

LORD HUGHES: Perhaps.

The Society's Technical Committee have considered this discussion very carefully. Rather than comment on each successive question and answer, the views of the Committee have been collated and are reproduced below.

### **Petrol-Engined Vehicles**

The population are entitled to air that is not unnecessarily polluted. The pollution from petrol engines, which is increasing with the growth in the number of vehicles on the road, is the result of inefficient combustion, with consequent waste of fuel. Greater efficiency with a reduction of pollution and of fuel consumption can be obtained by the use of improved carburettors or systems of fuel injection. The additional cost of the equipment for these more efficient methods (probably ranging from £10 to £50 according to the system adopted) is small in relation to the price of a car and is offset by a saving in fuel consumption. Such extra capital cost is less than the additional cost of an automatic gear box, which increases fuel consumption.

We do not favour the use of after-burners which are fitted with catalysts, and which have been used in the United States with limited success.

### **Diesel-Engined Vehicles**

Emission of smoke from diesel-engined vehicles is not caused by overloading but by the injection of too much fuel in relation to the air supply when the accelerator is fully depressed and/or to unsatisfactory maintenance of the engine. Admittedly, if the vehicle is overloaded the accelerator will be fully depressed for longer periods than when the vehicle has a light load or is empty.

The emission of smoke can be prevented by suitable setting of the device to limit the maximum rate of supply of fuel to the engine, provided that the engine is properly maintained. In our opinion, the limit required by the latest British Standard Specification is not adequate.

### **International Agreement**

Determined efforts should be made to reach an early international agreement, firstly in Europe, on the standards to be set greatly to reduce air pollution and to improve fuel efficiency for both petrol-engined and diesel-engined vehicles. Practicable methods are available.

The following extract from *Hansard* reporting questions in the House of Commons requires no comments.

## HOUSE OF COMMONS

24th June, 1969

### CLEAN AIR ACT (DIESEL FUMES)

MR. HUNT asked the Minister of Housing and Local Government whether he will seek to amend the Clean Air Act 1956 to cover the emission of diesel fumes.

MR. GREENWOOD: Emissions from vehicle exhausts are already dealt with under the Road Traffic Acts, under which my right hon. Friend the Minister of Transport has appropriate powers and duties, and I do not think that any amendment of the Clean Air Act in this respect is appropriate.

MR. HUNT: Is the right hon. Gentleman aware that diesel fumes, particularly from heavy vehicles, represent a growing hazard to life? Is he aware in particular that residents living near Bromley bus garage are being subjected to intolerable nuisance from the emission of these fumes and have been told that they have no redress in law against the negligence and indifference of London Transport in this matter? Can he do nothing to help?

MR. GREENWOOD: I will look into that case, if the hon. Gentleman will let me have the information, and pass it to my right hon. Friend who would more appropriately deal with it.

The Clean Air Council discussed this with the Joint Parliamentary Secretary to the Ministry of Transport in February and made no recommendation about legislation following that discussion.

SIR G. NABARRO: Is the right hon. Gentleman aware that the Department of Scientific and Industrial Research has had this problem before it for eight years and has not brought forward any constructive recommendation for its solution? Is he further aware that the very great increase in the number of motor vehicles on our roads and the emission from exhausts are negating practically the whole benefit derived from the original Clean Air Act?

MR. GREENWOOD: Characteristically, the hon. Gentleman has highlighted one of the difficulties in this matter, and that is the absence of absolutely conclusive evidence.

MR. ELLIS: How many prosecutions have there been under the Act? Does not my right hon. Friend agree that much needs to be done in the enforcement of the Act? Will he confer with the Home Secretary with a view to doing this?



# Problems in Aluminium Refining

A Paper presented to the Annual Conference of the Scottish Division at Largs on 22 May, 1969, by Dr. E. A. B. Birse, O.B.E.

Aluminium refining is carried out mainly in recovering what is called secondary aluminium metal from scrap. Production of primary aluminium metal by smelting alumina ( $\text{Al}_2\text{O}_3$ ) involves very little refining. The quality of the aluminium is regulated by controlling the purity of the raw materials. Alumina, for example, is extracted from bauxite ore under close chemical control. Refining and smelting aluminium are separate industries, each with air pollution problems of its own. Recovery of scrap aluminium, however, is on a fairly small scale in Scotland and this short paper is confined to smelting aluminium which is more topical now that the 100,000 tons per year smelter is under construction at Invergordon.

## Smelter Emissions

At the Invergordon smelter, and at the two others under construction at Holyhead in Anglesey and Lynemouth in Northumberland, the air pollution problem will be predominantly the need to control an invisible emission of fluorides. Smoke makes this emission visible from the existing Highland smelters at Fort William and Kinlochleven, but the new smelter will be smokeless. Any smoke which may be seen at Invergordon will come from ancillary processes, particularly the making of carbon electrodes for the smelter, and its control to Ringelmann 2 standard should be possible.

## Fluorosis in Livestock

Fluoride emission from an aluminium smelter is a problem mainly because livestock grazing on excessively contaminated pasture suffers characteristic damage which goes by the name of fluorosis. An early warning symptom of this disease is yellow, brown or black staining of the teeth of cattle or sheep. Teeth staining is not serious in itself, and it is sometimes called cosmetic damage. Further ingestion of fluorides, however, leads to breakdown of the tooth enamel exposing the dentine which wears down to the tooth pulp when ruminant animals chew their cud. Ultimately the animals have great difficulty in chewing their cud and they become emaciated. Even if they survive this severe damage to their teeth, a progressive stiffening of joints and embrittlement of skeletal bones continues. The Central Veterinary Laboratory at Weybridge have investigated this problem and on the basis of their recommendations general agreement exists that to avoid cosmetic damage, pastures grazed by livestock should not contain more than 30 p.p.m. fluorides when averaged over a year. Plants and trees can also be damaged by fluorides, among the most sensitive of garden plants are certain

varieties of gladioli, but generally plants of economic significance in agriculture are considerably more resistant. Of trees, certain species of pines are fairly sensitive, but control measures which are effective in protecting livestock from damage should adequately care for plants and trees. Risk to public health by inhalation or contamination of water supplies or food stuffs is even less, and indeed negligible.

### **Electrolytic Process**

Aluminium metal is smelted from alumina by an electrolytic process. Alumina is dissolved in molten cryolite (sodium aluminium fluoride), and an electric current is passed from a carbon electrode (anode) which is suspended in the molten solution to the carbon lining of the containing pot (cathode). Molten aluminium separates at the cathode and, as it has a greater density than molten cryolite, it gathers in a layer at the bottom of the pot. From time to time molten metal is tapped from the pots, and fresh alumina is added to replace what has been electrolyzed.

The other product of the electrolysis is oxygen which is liberated at the carbon anode and this oxygen combines with the carbon to form  $\text{CO}_2$ , and in effect causes the anode to burn. The carbon dioxide is the main gas emission from the pot. In other words the basic electrolytic process of manufacture does not in itself evolve fluorides. Nevertheless, fluoride usage occurs in a number of secondary ways, and fluoride additions have to be made to the molten cryolite.

### **Fluoride Fumes**

Cryolite is a very stable compound but at the high operating temperature ( $950^\circ$  Celsius) some vapour of sodium and aluminium fluorides is present above molten cryolite. Although a solid crust forms on top of the molten cryolite in a pot, this crust is incomplete around the anode where carbon dioxide is being evolved, and some fluoride vapour becomes entrained with the carbon dioxide. Again, when the crust over the rest of the molten is broken for addition of alumina or fluorides, this vapour of fluorides escapes into the ambient air above the pot. Apart from this loss of fluorides by vaporization, cryolite is itself electrolyzed when the concentration of alumina in the molten cryolite falls below a critical level. This loss can be quite substantial but modern operating techniques reduce very markedly the frequency of this occurrence, which is known as the anode effect. Total losses of fluorides from a large modern pot during a day amount to only 25-35 lbs. per 24 hours, but in a modern smelter with more than 350 pots the overall emission of fluorides is quite significant.

### **Fume Treatment**

Early aluminium smelters did not collect and treat the fluoride emission. Indeed, the potmen looking after pots were at one time exposed to the fumes in the pot rooms which were then ventilated through the roof mainly by the natural draught created by the heat of the pots. No serious effect on their health appears to be on record. Over the last 25 years, however, steady progress has been made in the industry both here and abroad with collection and treatment of fumes. The Highland smelters have been in recent years the only ones in the U.K. prior to the Invergordon project. From the early 1950s the Highland smelters have been equipped with collection and treatment of fluoride fumes for all their pots, where previously only some of the pots were equipped with collection, and treatment of fumes was not regularly in use. About that time too, smelting of aluminium



came for the first time within the provisions of the Alkali Act. Since then a high degree of fluoride arrestment (better than 95 per cent) has been regularly attained, but collection of equal efficiency has been one of those technical problems which seem to slip through the fingers.

### **Fume Collection Problem**

At first, problems of sampling traces of fluorides, which escaped into the natural ventilation issuing from the roofs of pot rooms which are several hundred feet long, made it difficult to establish whether or not fume collection was falling short and creating air pollution. All that was apparent was an unaccounted loss on balancing up fluoride usage; and fluorides are lost in other ways which create no air pollution such as absorption in the carbon linings of the pots. In the end, work by the owners, and others in the industry abroad, showed that collection of 60 per cent was probably quite typical and 90 per cent exceptional. A practical way of total-hooding of the pots had been sought without any real success. Additions of alumina, fluorides and coke-pitch mixture to self-baking anodes, and adjustment of the electrical stubs which feed the current into the carbon anode presented major design problems. Abroad, treatment of the fumes as they came through the pot room roofs was tried, but loss of efficiency in treating trace concentrations of fluorides in the large volume of air coming through the roof tended to be a serious disadvantage of this method. There the problem rested in Europe, and probably in much of the U.S.A., until the recent Government move to increase U.K. production of aluminium.

### **Fume Collection at New Smelters**

Construction of the first of the new generation of U.K. smelters was proposed at Holyhead in Anglesey. Like the project for Invergordon its plan capacity is some three times that of the two existing Highland smelters. When details of the design became known it was clear that a breakthrough in the collection problem had been achieved at some smelters in the U.S.A., where the industry is adopting an improved version of an earlier design of electrolytic pot with pre-baked anodes instead of self-baking anodes. With the elimination of the need to feed a coke-pitch mixture it has been found possible to automate nearly all the routine manual operations at the pots in a way which allows each pot to be totally enclosed within hoods. For operations which still require to be carried out manually, hoods need be removed for not more than 5 per cent of a 24-hour day; that is to say, 95 per cent collection is achievable. When coupled with the U.K. practice of 95 per cent arrestment, the overall problem should be largely resolved. This development, of course, did not take place in one step but it has been evolved in the U.S.A. with construction of new smelters to meet the recent world expansion in aluminium production.

### **Prediction of Contamination**

Alongside this technical advance in dealing with the fumes, a computerized study of environmental pollution by fluorides at an aluminium smelter in the U.S.A. has brought out a much needed correlation between atmospheric pollution and fluoride contamination of pastures. This correlation indicates that one microgram per cubic metre fluorides in air corresponds to the Central Veterinary Laboratory limit of 30 p.p.m. in pastures. Using the formulae which are the basis of chimney height calculations, it is possible to design chimneys of suitable height to prevent the treated escape of fluorides raising the pastures to the limit of 30

p.p.m. Inevitably, however, 5 per cent of the fume will escape through the pot room roofs and it is not possible to avoid this escape raising the pasture in the immediate area of the smelter above 30 p.p.m. fluoride. Estimation of the area likely to be affected in this way is possible, and for the 100,000-tons melter at Invergordon, the radius of the area is expected to be less than 2,000 metres. But for improved collection efficiency, this radius would be considerably greater.

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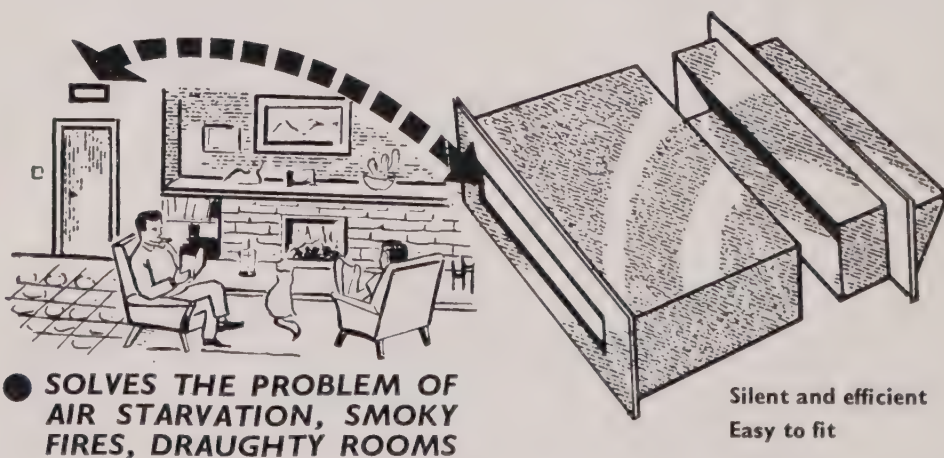
### Combustion Engineering Conference

The Combustion Engineering Association are holding a Conference on "Legislation and the Fuel User" at Brighton on the 29 and 30 October, 1969. Among the subjects to be discussed will be: Industrial Training Act; the C.E.A. Boiler Operator Training Scheme; payment of grants; the 1968 Clean Air Act; the Factories Act amendments 1961; grit and dust measurements; the place of the local authorities; chimney heights; change of certain works from control by the Alkali Inspectorate to the Public Health Authority.

Full details of the Conference and Application Form may be obtained from the Director, Combustion Engineering Association, Trident House, Station Road, Hayes, Middlesex.

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Ashington Urban District Council are to stop checks on air pollution following a report presented to them by Mr. S. Musk, the Chief Public Health Inspector, who recommended that no further checks should be made until the Council decided to control smoke from domestic appliances.

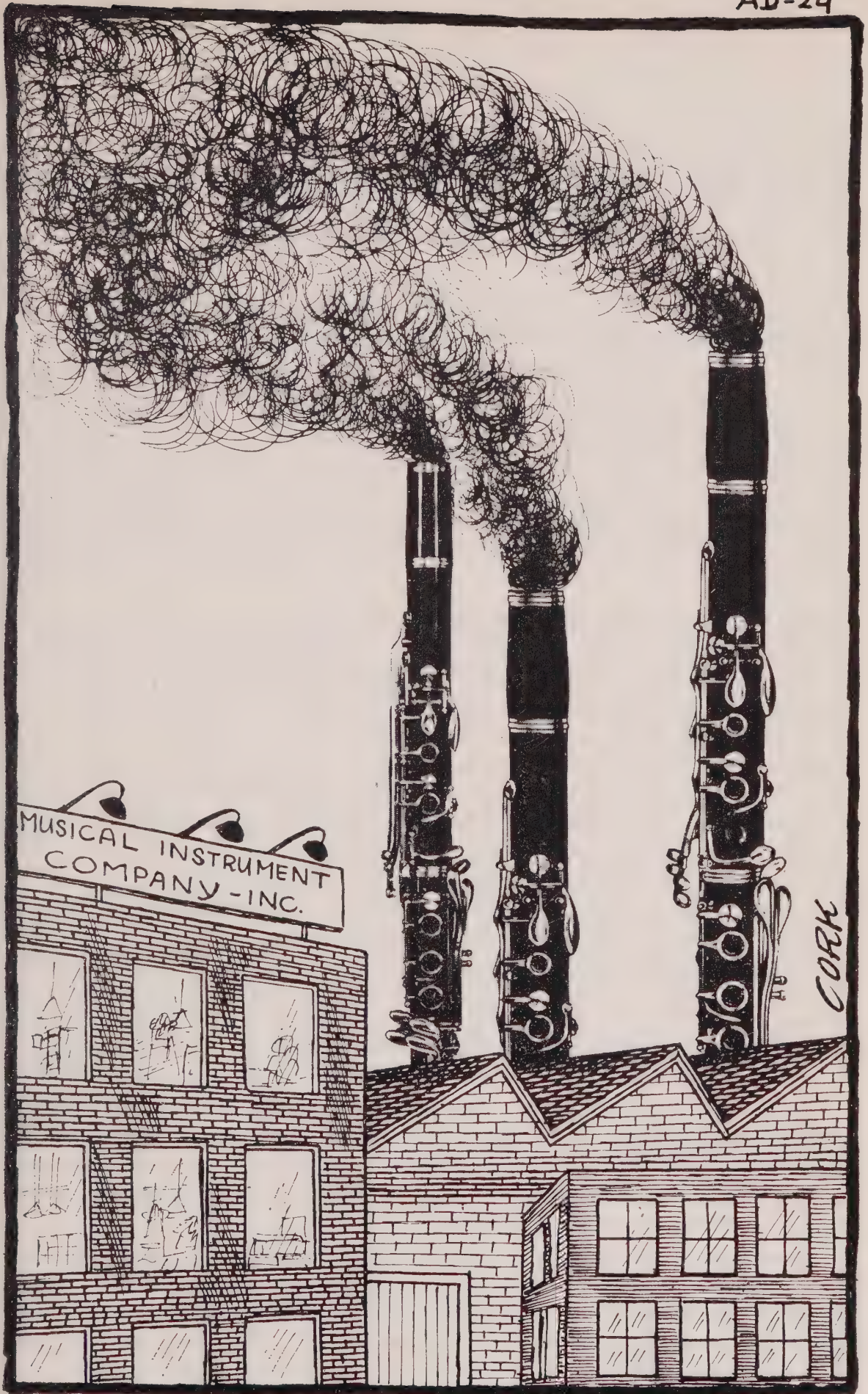


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# The Success of Clean Air as seen by a Housewife

A Paper Presented to the Annual Conference of the Scottish Division at Largs on 23 May, 1969 by Bailie, Mrs. Agnes Ballantyne.

Clean air is accepted by most people, like pure water, as one of the simple, bare necessities of life, and they protest when they do not get it. Glasgow has had clean water for over 100 years but up until recently still tolerated the smoke and grime and overcrowding which made many of our citizens invalids long before their working days were over. The effect on stonework, paintwork, metals and furnishings, time-off work costs the nation more than £200 million per year.

Industry has gone a long way in setting its house in order as it is now a fact that 80 per cent of all smoke comes from the domestic fire. The amount of smoke produced by industry is estimated to have been reduced by over 75 per cent since 1958 as compared with a reduction of 30 per cent in domestic smoke over the same period.

Industry has many emission problems other than smoke—fumes, grit and dust. These problems are covered by Statutory Regulations enforced by Local Authorities and the Alkali Inspectorate. These problems cannot be solved overnight, however, with advances in the technology of arrestment, more and more “practical means” are being made available to industry.

Smoke is with us all winter and although its day to day effect must not be belittled, smoke is at its worst when it combines with fog to form the killer smog. The London smog disaster of 1952—a dozen square miles of smog—killed 4,000 persons in three weeks—and another 8,000 persons in the next three months. The action taken by the Government after the 1952 London smog disaster was the setting up of the Beaver Committee under the Chairmanship of Sir Hugh Beaver—result: the Clean Air Act, 1956.

How does one assess the cost of this atmospheric pollution? Is it the fact that in any one year in Glasgow that 600-700 persons die of bronchitis and thousands suffer from it. That the effect on stonework, paintwork, metals and furnishings, time-off and hospital services costs Glasgow some £25 million per year. Whatever way you look at it the cost is high.

The introduction of the Clean Air Act, 1956, following on the London smog disaster of 1952 made provision of a 70 per cent grant (30 per cent local authority, 40 per cent Government) for domestic fireplaces and of course it dealt with smoke from industry, shipping and steam locomotives. It was however the 70 per cent grant which gave teeth to the legislation.



In Glasgow we started our first Smoke Control Area in the centre of the city and consulted the Meteorological Office as to the prevailing winds which cross the city. It was found that the prevailing winds take the form of a lazy or flattened "S", south-west to north-east. It was decided that the city's Smoke Control Areas should follow this pattern. The object being that once an area is smoke-free the smoke from the adjoining areas should not blow across areas already cleared.

At present in Glasgow, Smoke Control Areas cover 57 per cent of the acreage of the city, 44.3 per cent of the houses and 47 per cent of the population. The city now has 156,955 premises under Smoke Control Area Orders and next year this total will be increased to some 176,000 premises.

While there is no doubt that the extension of the Smoke Control Areas has made a visible improvement in the atmospheric conditions in the city, the full effect will not be appreciated until the whole city becomes a Smoke Control Area and the neighbouring counties have taken similar action.

It is perhaps easier to understand the difference Smoke Control is making to the City of Glasgow if I tell you that in the year 1959/60 the average total of deposited matter, ash etc., was 203 tons per square mile as against a figure of 158 tons per square mile in 1967/68. Smoke itself has been reduced by 50 per cent since 1959.

The benefits to be derived from a clean atmosphere are far reaching and the cost of attaining the same infinitesimal to the cost to health, property and the general well-being of the community at large.

Each year the citizens of Glasgow see the changes clean air is making in our daily lives. The home is cleaner and stays cleaner longer, brighter fabrics are being chosen where in the past the practical housewife would have chosen a fabric more in keeping with the smoky atmosphere. Brighter paints and wall-papers are "in" in our Smoke Control Areas.

In the heart of the City, office workers sit eating lunch amid the flowers and trees of George Square. This, in a city where not so long ago one would have thought twice before sitting in a seat lest you ruined your clothes. The floral displays and the cleaning of the buildings are bringing colour and brightness to the heart of a great City. Floral displays which I may add are being extended into the main streets of our City centre.

Clean air has also assisted on the cultural side by removing one of the main objections—atmospheric pollution—in the housing of the famous Burrell Collection within the City boundaries.

By the cleaning of our buildings and raising our heads, we in Glasgow can now appreciate the architectural heritage of our forefathers—yes—we are washing our face and are amazed at the transformation.

Now how does the housewife fare in this campaign? Is she happy with the fact that she can still retain her open fire with as much if not more warmth and hot water than before? That by using central heating, things will remain cleaner a lot longer? Of course, housewives being the practical people are the first to notice the benefit of living in a clean atmosphere. However, the housewife while appreciating clean air, can also appreciate the upward trend in the

cost of all smokeless fuels including gas and electricity. She can also appreciate the feelings of aged persons who, according to “statistics” or “average” costs should not be affected by the change-over, are apparently feeling the pinch financially.

Should not more guidance be given to gardeners in the burning of garden rubbish? In this age of wrapping paper and packaging, what do we do with the additional household rubbish? What action is being taken to stop unscrupulous coal merchants selling coal in Smoke Control Areas? What about the fumes from motor cars? These are some of the questions to be answered. We in Glasgow having had a taste of clean air want more. Greedy, perhaps, but as far as clean air is concerned we want it and we mean to get it.

Glasgow citizens are in favour of clean air and it is hoped that with the Corporation's programme to have the whole city smoke-free by the mid 1970s, they may look forward with anticipation to “Let Glasgow Flourish” in a clean and bright atmosphere.

## **The Success of Clean Air as seen by a Meteorologist**

**A Paper presented to the Annual Conference of the Scottish Division at Largs on 23 May, 1969 by H. A. McKellar (Officer in Charge, Glasgow Weather Centre)**

As a meteorologist or climatologist I am not concerned with the chemical aspects of air pollution—I am only concerned with the physical effect upon weather elements of the release into the atmosphere, of the products—I should say the solid products, of combustion processes.

The weather elements with which I am concerned are atmospheric pressure, air and ground temperatures, humidity, visibility, wind behaviour, sunshine, state of sky, rainfall and cloud details. The great majority of these elements are not affected by smoke pollution, or, if they are, the effect is so slight or of such a long-term nature, or so complicated by other factors, that in the sort of investigation which I have been able to undertake no positive or meaningful results could be hoped for. Into this category, for example, would fall global mean temperatures as affected by wide carbon dioxide concentrations on the edge of space—or, nearer home, some increase in cloudiness and rainfall produced by increases in concentrations of suitably hygroscopic cloud-forming nuclei—and many of the products of combustion are of this nature. One might expect the intensity of sunlight to be diminished by smoke—and one would be correct—but intensity of sunlight is not measured—or at least it is not measured in areas where smoke pollution is a problem, so far as I am aware.



To me, the only one of my weather elements which is clearly and readily affected by smoke, is visibility—this is an element which happens to be regularly and frequently measured in many parts of the country—and in many cases, continuous records of visibility extend back for several decades. And so, my contribution to these proceedings is concerned with variations in visibility.

When smoke (and by smoke is meant warm gases carrying some solid particles) emerges from a chimney, it usually rises because the gases are warmer and therefore less dense than the surrounding air—the greater the temperature difference the greater the rate of rise. As the smoke rises, its temperature decreases and its density increases, but, in favourable circumstances—and these will be found on many days, the surrounding air is also cooling. So, the smoke will continue to rise, that is to say, it will disperse vertically and there will be no low-level concentration of the products of combustion. Such vertical dispersal is therefore associated with weather situations in which the ambient air temperature decreases steadily, continuously and fairly quickly with increased height, and these conditions are commonly associated with air travelling from some northern source, although it actually may reach the area in question from the west or thereby, having taken a curved course in its travel.

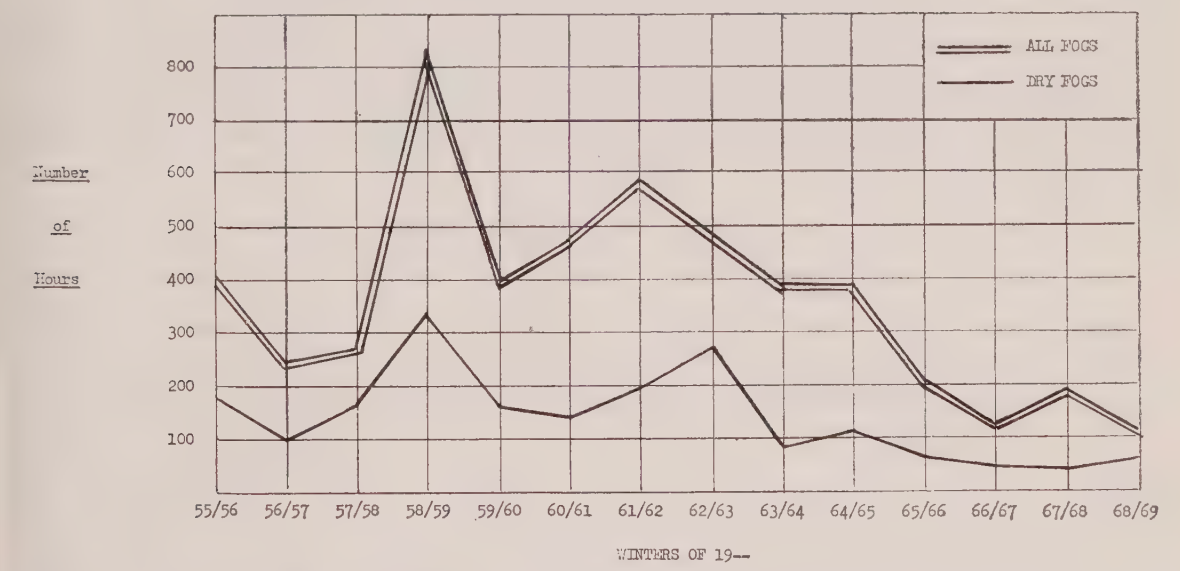


FIG. 1—Number of Hours of Fog (Vis<1000m) and Number of Hours of 'Dry' (Vis<1000m and R.H.<95%) at Glasgow Airport, in each Winter from October 1955

Now let us suppose a situation in which we have a clear, still night—by around dawn, the temperature of the air at or near ground level will have fallen considerably by contact with the cold ground. At the same time, the air at say 500 feet above ground level will have suffered little or no cooling. It may well be that the lower layers are now considerably cooler, say 5°F. cooler, than the higher layers, and on such an occasion, the chimney smoke, only one or two degrees warmer than the air at low-levels, rises initially, but, within 100 or so feet, finds itself meeting with air warmer than itself. The smoke, then, being cold relative to its new surroundings, is more dense and tends to sink back towards the ground. More smoke is emitted, and it, too, rises a little, initially, before sinking groundwards. And so we have the situation where there is strictly limited

vertical dispersal, leading to thicker and thicker concentrations of pollution at or near ground level—if you like, the smoke is trapped under a warm lid.

Let us now suppose that the sun rises. Its rays will be scattered by the thick haze and some part of the solar energy will be lost—but, at least in spring, summer and autumn, enough will get through the haze to warm the ground and, by conduction, to raise the temperature of the lower levels of the atmosphere. This will lead to turbulent mixing up to increasingly high levels, causing a *drop* in the air temperature at the 500-foot level, the height of the warm lid. That is to say, the warm lid becomes less warm and in time the turbulent mixing will cause this confining barrier to disappear. When this happens the smoke will be free to rise and disperse vertically, near-ground-level concentrations will thin out appreciably and visibility will rapidly improve.

Please note that, in winter, when the sun is never high in our northern skies, the effects of solar radiation are consequently weak—so weak that, to coin a phrase, the sun cannot get through to warm the ground—so your smoke will be more likely to persist—and thicken.

In some air-masses, particularly some of those which come to us from the east, an inversion of temperature may exist at about 3,000 or 4,000 feet. Such inversions are also a common feature of anticyclones. Only in the height of summer will solar radiation be strong enough to break down such inversions. At other seasons one must grin and bear it, realizing that, although there is this warm confining lid at height, the height is sufficiently great to allow a reasonable amount of vertical dispersal of smoke pollution.

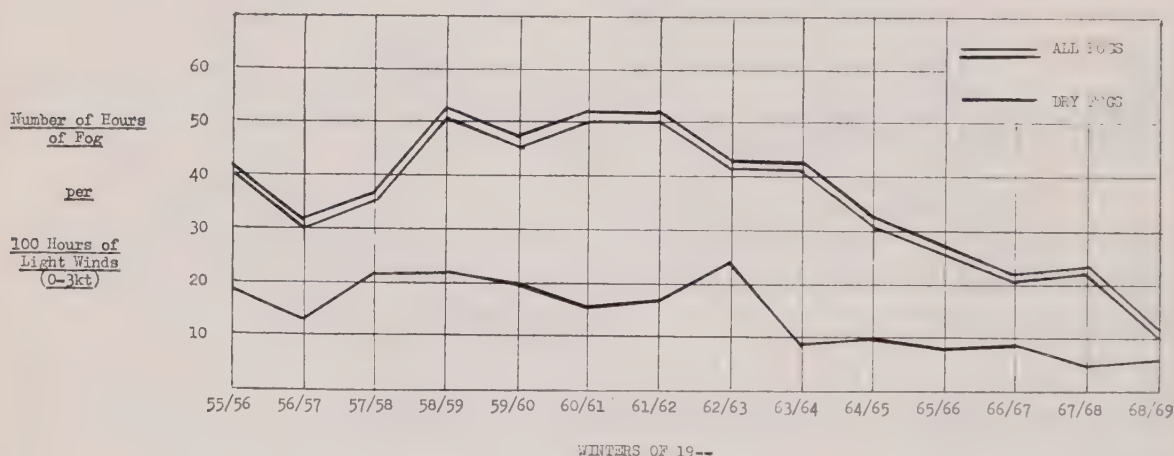


FIG. II—Number of Hours of Fog (Vis<1000m) and Number of Hours of 'Dry' Fog (Vis<1000m and R.H.<95%) per 1000 Hours of Light Winds (0-3kt) at Glasgow Airport in each Winter from October 1955

And now, a word about wind behaviour. Whenever a wind is blowing, you can be sure that this air motion, on its own and without any other cause will produce a positive lapse rate of temperature from the ground to some higher level, i.e., due to mechanical turbulence, the temperature will decrease with height and smoke will disperse vertically to some extent. On an anticyclonic winter's morning, the effect of a 10 m.p.h. wind would probably be to increase from, say 500 feet A.G.L. up to 1,000 feet A.G.L., the depth of the smoke and



fog-filled layer, leading to a decrease in concentration of smoke particles and to an improvement in visibility.

Having decided to use visibility as a measure of atmospheric pollution I was obliged to look around for at least one area which would satisfy two requirements which I regard as essential. Firstly, and obviously, it would have to be an area within which Smoke Control Acts had been progressively in operation for some years on a significant scale. Secondly, it would have to be an area within which or closely adjacent to which, observations of horizontal visibility had been recorded for a large number of years, indeed for a period extending back to well beyond the date on which the Smoke Control Acts had first come into operation; this in order that I could compare results “before” and “after” as it were. Furthermore, such visibility observations would have to have been made in an objective fashion by trained observers, all using the same methods.

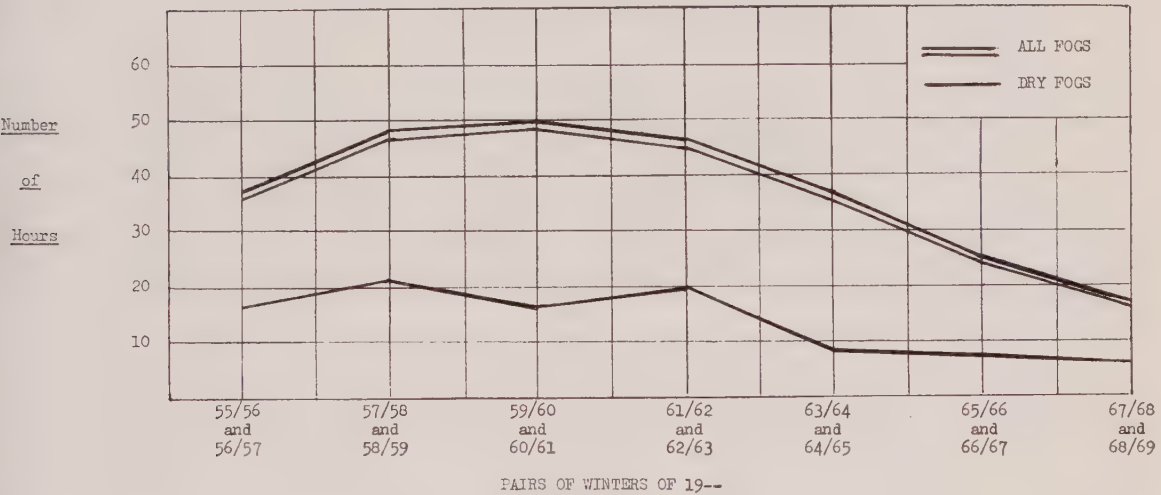


FIG. III—Number of Hours of Fog (Vis<1000m) and Number of Hours of ‘Dry’ Fog (Vis<1000m and R.H.<95%) per 100 Hours of Light Winds (0-3kt) at Glasgow Airport in Pairs of Winters from October 1955

In the whole of Scotland, I found these requirements to be met outstandingly well in the Glasgow area. In the Glasgow area I include for this purpose, but strictly for this purpose only (I being a Paisley man), the Burghs of Port Glasgow, Renfrew; Paisley, Barrhead, Dumbarton, Clydebank and Milngarvie. In all of these towns and in the City of Glasgow smoke control orders have been in force for large districts from dates varying from 1959 to the present day—and of course, new areas are progressively being added to the older existing ones.

Within this “Glasgow Area” are the Meteorological Office establishments of Glasgow Weather Centre, right in the middle of the city and Abbotsinch Meteorological Office at Glasgow Airport. The Weather Centre, which is my office has not been in operation for long enough to provide visibility records sufficiently long-term—nor is our anemograph exposure quite suitable.

But at Glasgow Airport, observations of horizontal visibility have been made, for the purpose of aviation advice, for about 40 years—and all of these observations have been recorded and are available to the investigator. One snag encountered was that the Meteorological Office had temporarily deserted the

Abbotsinch site from about 1945 until 1966, by moving over to Renfrew, about two miles away, while the Navy occupied Abbotsinch. However, the importance of this change turned out to be more apparent than real. I studied five years of simultaneous observations from the two sites and found them to give identical results.

A second difficulty which I encountered proved to be much more serious and restricting. Since visibility is affected greatly by wind speed, particularly in the lower velocity bracket, it was essential that the wind measuring device be constant in its efficiency at low speeds throughout the investigation period. So it was with some dismay that I discovered that in the spring of 1955 a change of anemograph had taken place. Prior to 1955 a Dines Pressure Tube Anemograph had been in use for about 25 years. Since then an electrical anemograph has been in operation. The significant difference between these two is that the former has a marked tendency to record apparently more calms and light airs than does the latter. Accordingly, my investigation has been restricted to the winter months, in the Glasgow Area, from October 1955.

Firstly, I considered, rather simply, all fogs in each winter using the aviation definition, of occasions of visibility of less than 1,100 yards. Many of these fogs would be of the water-droplet type, so another table of results was prepared showing the total number of so-called 'dry' fogs ( $< 95$  per cent Relative Humidity) in which the obscuring particles would be mainly solids, i.e., the products of combustion rather than water-droplets. These values in numbers of hours of fog, are shown in Fig. I.

However, these values are not to be taken at their face value. A winter in which there is a great deal of wind, will, all other things being unchanged, produce fewer fogs than a winter in which winds are generally light, or at least lighter. So, in Fig. II we have the numbers of fogs per winter, expressed per 100 hours of light winds ( $< 4$  knots), the top curve referring to all fogs, the lower to 'dry' fogs ( $< 95$  per cent Relative Humidity).

		Below 1000yds	1000/1999yds	2000/3999yds	4000yds/4mils	4 - 8 mls	8 - 12 mls	12 - 20 mls	> 20 mls
A	Average Oct 1958 to Mar 1962	4	35	40	21	0	0	0	0
B	Actual Oct 1960 to Mar 1961	0	3	43	26	20	8	0	0
C	Actual Oct 1960 to Mar 1961	0	0	0	6	30	24	24	16

FIG. IV—Observed Percentage Frequency of Occurrence of Visibility in certain Ranges at Glasgow Airport with winds of 7-10 kt from (A) and (B) 020°-100° and (C) 240°-320° in certain Winter periods

The decrease in values in the winters of '56/57 and '57/58 seem peculiar—I cannot explain them—perhaps some City Smoke Control Officer has the answer. Looking again, from '57/58 for the next four or five years, my only comment as a layman in industrial development, is that it seems to have been a good thing that the Smoke Control Orders began to operate when they did.



Notice the increase, then the steadying out and at last, the welcome decline in the number of hours of fog. The high value of "dry" fogs in the winter '62/63 calls for some explanation. I think that persistence played a significant role—i.e., some of the total of hours of fog would not have been recorded had there not been fog for a good number of hours previously. For example, a persistent light easterly drift will bring smoke from the industrial central districts right across into the Firth of Clyde. A subsequent light westerly drift will bring the accumulation slowly back again, adding to the total of fog-hours—whereas, such a light westerly from a relatively smoke-free source can usually be counted upon to give visibility well above fog limits.

In Fig. III, I have simply shown the winter seasons in pairs. This has had the effect of smoothing out the curves and presenting, perhaps less truthfully, the steady progress which a biased mind might wish to see. However, Fig. III does indicate that, whereas in the winters of '59/60 and '60/61 there were experienced, on average, 52 hours of fog per 100 hours of light winds, the average for the combined winters of '67/68 and '68/69 was only 17 hours of fog per 100 hours of light winds. This can be expressed as a reduction of 68 per cent. When we take the values from the lower curve for the same period the percentage reduction is 62.5 per cent. I submit that these values have real significance.

For a final test, I examined all occasions on which the wind, as measured at Glasgow Airport, blew from between  $020^{\circ}$  and  $100^{\circ}$  (true), i.e., from the main smoke-producing areas, with a velocity of between 7 and 10 knots during the winter months from October 1958 to March 1962. The percentage frequencies of the visibility in the ranges stated, are shown as the upper line of values in Fig. IV.

The second row of values in Fig. IV represents the percentage frequency of visibility occurrences for the winter of 1968/69. The two sets of values are quite comparable and study of them makes self-evident the improvement in the Glasgow Area visibility during the intervening years.

But before self-congratulation goes too far, a study of the bottom row of values will be salutary. These figures show the frequency of visibility occurrence observed at Glasgow Airport with the wind, again between 7 and 10 knots, from between the SW and NW, during the winter of 1968/69.

I hope that the results of my investigation will be acceptable as showing that, over the past few years the visibility in the hitherto notoriously smoke-laden atmosphere of the Glasgow area has undergone a significant improvement—an improvement which, it seems logical to attribute to the operation of Clean Air Orders.

I do not know whether it comes within my terms of reference, but I would like to make one or two suggestions for further improvements. Apart from the extension of Clean Air Orders to cover wider areas, it seems to me that, firstly and without having regard to the amenity question, industrial chimneys could be built significantly higher, i.e., their tops could be brought closer to, or even beyond the average height of temperature inversions, for obvious reasons; and secondly, that all industrial chimneys might well be designed in such a fashion that smoke when it is emitted, is emitted with a much greater velocity, thus increasing the chances of it bursting through any temperature inversion or other stable layer which may be present.

(In preparing this paper, much help was obtained from Mr. W. Muir, the senior meteorological officer at Glasgow Airport.)

# The Success of Clean Air as seen by a Horticulturist

A Paper Presented to the Annual Conference of the Scottish Division at Largs on 23 May, 1969 by A. S. Dow, F.I.P.A., D.H.E.

As a Director of Parks and Recreation air pollution is a factor which has had a strong bearing on my training and experience. This has been gained in many areas from the clean air of Moray and Argyll to the not so clean air of Glasgow, Edinburgh, Fife and Dundee. Only in Glasgow and marginally, perhaps in Edinburgh can it be said that air pollution conditions are detrimental to plant life.

To the horticulturist, air pollution is something slightly different from the subject matter of this Conference today. By upbringing and training he is concerned not only with the effects of sulphur dioxide, soot and other pollution, but also with wind-borne fungi spores, pests and weed seeds; also pollen from plants which is responsible for hay fever. In seaside towns, salt spray is of much greater concern than industrial pollution, and quite recently a sodium chlorate explosion in the midlands of Scotland created a fall-out of that particularly fine weed killer, which was not greeted with any great pleasure by the local allotment holders and gardeners. Thus, air pollution to the horticulturist is rather a varied and complex matter. In the process of fumigation, pollution of the air is used beneficially in glasshouses. These gases based on phosphorous, cyanide and nicotine, although poisonous, do not normally damage plants. On the other hand, during smog conditions, if a ventilator is left slightly open serious defoliation can occur. Thus we have smog in this particular instance being much more damaging and dangerous than any of the above gases which are deadly to human life.

So far as Parks Departments are concerned, the creation of smoke controlled areas will provide considerable beneficial results on the long term basis, but only in areas where there has previously been a high incidence of pollution will immediate results be apparent.

Now that the open system of landscaping of housing schemes has been accepted, modern municipal housing consists of large landscaped areas of high amenity value. This new type of development creates fresh air lanes linking up the existing traditional parks systems and provides funnels along which fresh air flows into the high density central areas.

Stuttgart in Germany, with a population of over 600,000, has probably the best example of this type of air flow and the particular problem was fully discussed at the Conference of the International Federation of Landscape



Architects held there in 1966. From this evidence it is apparant that the landscape architect, making provision for the future in municipal development, must be aware of the challenge he has before him not only to provide amenity but also to do something on a long term basis for the betterment of air conditions for our future generations.

In Paris, considerable research has been carried out into the effects of petrol fumes and lead deposits. From the evidence available it is interesting to note that in some of the treed back courts separated from the main streets by only a line of buildings the air was found to be pollution free.

In Dundee, each year for the past three years 100,000 pines have been planted in landscaped areas. Not only will these trees improve the amenity but within a matter of ten years they should be providing a beneficial effect on the atmosphere. Trees act as filters extracting debris from the air. Scots Pine has been known to extract up to 14 tons of air pollution debris per acre per annum. This is particularly significant when it is known that a power station can throw 160 tons of this material into the atmosphere daily.

Recently it has been noted in the English Midlands that some flowers now appear to show brighter colours. Previously white flowers could not be grown because of atmospheric soot. Now the use of white as a colour foil is again possible. It is difficult, however, in the current circumstances to relate colour variations directly to cleaner air as at the present time plant breeders tend to introduce new varieties yearly claiming brighter colours than those of the previous year. Hence there is need for detailed consideration before jumping to conclusions.

Many varieties of roses just will not grow in areas of pollution. The polyantha variety "Korona" was probably one of our best types in Scotland, but when introduced to the English Midlands it was a dismal failure. Super Star is another excellent rose here, but it will not grow under air pollution conditions.

With a reduction in the sulphur dioxide content there is hope that industrial cities such as Leeds and Manchester, which previously could not provide, spring displays of wallflowers and myosotis will now, or perhaps in the near future, be in a position to enjoy this seasonal attraction.

The reduction in the soot and oil content of the air should create better conditions for photosynthesis; thus better crop yields for market gardeners and farmers should be expected. The area surrounding Leeds with its noted ability for growing commercial rhubarb may now have some difficulty in maintaining its previous position.

Probably all persons here today have read the report by the Chester Beatty Research Institute, which deals with the problem of petrol fumes and their lead deposits. Reference is made in the report to the potentially dangerous effects of these lead deposits on food crops growing near to high density traffic routes. To counteract this, it would appear that many local authorities will require to re-think their roadside maintenance policies, which at present make provision for the mowing of roadside grass verges and the destroying by herbicides of all forms of tree and scrub life. The presence of these vegetative screens between the traffic and the food crops creates a barrier preventing contamination; thus, rather than destroying these barriers, additional planting should be provided

for. Much research on this lead problem has already been carried out in the U.S.A. and Germany.

Rather an unusual angle is the fact that with cleaner air it has been found that certain insect pests which were previously camouflaged will now require to operate in their original natural colouring, again requiring to run the gauntlet of the natural predators.

In certain towns in England previously affected by air pollution the landscape is mainly based on a monotypic tree population, the types used being those locally found to be best equipped to deal with the existing air conditons, e.g. London—London Plane; Manchester—Manchester Poplar. Gradually with cleaner air the tree pattern should change for the better although London in the past has done particularly well with its Planes.

Old fashioned ideas used to dictate that rain water collected from roofs provided the best results in plant growing; but recently in Sweden, research carried out into the effects of air pollution on rain water has provided evidence that in parts of Sweden the net acidity of the rain has increased eight times in four years. Thus it would appear that a review is necessary in the policy of collecting rain water for the growing of household plants.

Evergreens which are difficult to grow in polluted areas will again enjoy a more comprehensive representation with golden privets and sambucus again returning to their previous golden glory.

In many industrial towns the notice "Please keep off the Grass", although primarily displayed for the protection of the grass, had a dual purpose in so far as it kept children away from the grass which was soot laden and could become a ready source for the soiling of clothes. Parks employees too, at the end of the day, are sometimes difficult to distinguish from "chimney sweeps"; thus, although in Scotland we do not suffer in comparison to the English Midlands, there is no doubt that every Director of Parks in Scotland looks forward with increasing anticipation to the day when his selection of planting material can be extracted from any part of a planting dictionary without fear of the plant succumbing to the vigours of air pollution.

## **Clean Air and Health**

**A Paper Presented to the Annual Conference of the Scottish Division at Largs on 23 May, 1969 by V. M. Hawthorne, D.M.**

Epidemiologists are doctors who deal with populations rather than individual patients. Within their own specialities they devise methods of eliciting symptoms and signs: symptoms generally by questionnaires and signs by simple quick automated measurements, very much in the same way as the family doctor



elicits symptoms and signs at the bedside or in the surgery by asking questions and then listening with the stethoscope. Those epidemiologists specializing in chest and heart disease have been concerned for some years at the rising epidemic of lung cancer, coronary artery disease and, to a lesser extent, bronchitis, particularly in the West of Scotland where atmospheric conditions with frequent temperature inversions and pollution "trapping" seem to favour chest trouble. In Scotland about 20,000 people die of lung cancer, bronchitis and coronary artery disease each year. These death rates are among the highest in Europe and still rising, So the population doctors are always on the look-out for methods of detecting these diseases while people still feel fit.

In Scotland since 1962 attempts have been made to measure the need for prevention in cardiorespiratory disease by ascertaining if a patient has bronchitis by asking him if he has a cough and spit, whether he gets breathless walking on the flat with people of his own age, and if he has been off work with a respiratory infection of two weeks duration at least once in the last two years.

This diagnosis of bronchitis is substantiated by asking the patient to blow into an instrument which measures how much air he can empty from his lungs in one second: a measurement which gives a clear indication of the amount of impairment of the functioning of the lungs which the individual has experienced in his lifetime. Thus it is possible to observe the decline of respiratory function with age. The lung reserves of those who smoke decline more rapidly than those who do not.

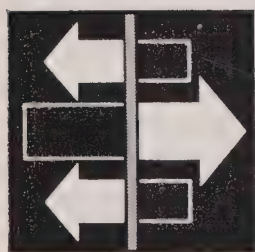
The same simple tests can also be used to measure the effects of atmospheric pollution on people. Thus at a town in the Clyde estuary, employees at the factory nearest the gas works had more evidence of bronchitis and more measurable impaired respiratory function than men of the same age and height half a mile downwind from the source of pollution. The same observation still held when non-smokers only were examined showing quite clearly that atmospheric pollution which need not be visible is an important source of impaired respiratory function.

On the island of Tiree which has been under close surveillance since 1967, males tend to be able to empty the air from their lungs rather less quickly than their coevals in Glasgow under the age of 40 years. Over 40, however, when the respiratory reserves have been exhausted, the lung reserves of the Glasgow males have declined so markedly that their average performance is much below that of Tiree. This again shows the serious effects of atmospheric pollution on urban compared with rural populations.

An important study by Douglas and Waller of the Medical Research Council involving over 4,000 schoolchildren followed from birth in 1946 to 1961 and measured by many methods at different ages up to 15 years, clearly indicated a marked association between lower respiratory infection and the level of atmospheric pollution in the air in which they lived. The pollution was measured in terms of smoke produced from burning coal per acre per annum by area of residence. In summary there is direct and continuing evidence that the extent by which we have poisoned our environment is manifest in the state of health of our people.

In the present situation, although a great deal has been accomplished in clearing from our environment visible pollutants, the emission of visible diesel smoke still appears to go unchecked. Again, by far the more serious pollutant is sulphur dioxide which combines in our watery atmosphere to form weak solutions of sulphuric acid. The corrosive effect on stonework is all too apparent but the acid has an equally deleterious effect on the delicate lining of the lungs. The combustion of one ton of fuel oil releases seven times as much sulphur dioxide into the air as one ton of coal. Sulphur dioxide is an important component not only of motor vehicle exhaust but also of refineries—built and projected. It is an inescapable fact that any increase in industry within our area will result in even higher levels of pollutants, visible or invisible, in our atmosphere; and there will be a measurable effect on our cardiorespiratory health. So we are going to have to weigh our need for a satisfactory economy against what might be the even greater need of a healthy environment in which to live and bring up our children. The decision will inevitably rest with the economists but then the whole value of The National Society for Clean Air is to make known as widely as possible the other factors affecting the choice which, after all, must ultimately rest with the members of the public.

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# Clean Air

**Düsseldorf, October 13-17, 1969**

Congress and Exhibition are held under the main theme "Modern ways to prevent air pollution". This demonstration of research and development and the presentation of a comprehensive specialised range of exhibits by the relevant industry will be supplemented by an information display under the theme: "Clean Air — progress and success."

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Organisers of the Congress and Information Display: VDI-Kommission Reinhaltung der Luft, 4 Düsseldorf 1 · Information: Düsseldorfer Messgesellschaft mbH — NOWEA —, 4 Düsseldorf 10, Messengelände, telephone 44041.



# District Heating Contributes to Clean Air

**\*by R. E. TULLY, C.Eng., M.I.Mech.E., F.I.H.V.E., F.R.S.H.,  
M.A.S.H.R.A.E., M.Cons.E.**

**and**

**S. P. CLEMENTSON, F.I.H.V.E.**

London's famous market area, Petticoat Lane, moves forward into the "clean air" age with the Middlesex Street redevelopment scheme of the Corporation of London. Here under construction are 181 modern dwellings to replace the grimy and depressing blocks of existing buildings. The site covers the area bounded by Middlesex Street, Harrow Place, Artizan Street and Gravel Lane. Round the perimeter of the site, buildings will be erected comprising shops and four storeys of housing, and towards Artizan Street a tower block will be built with 20 storeys of flats.

An interesting feature of the development is the provision of a podium slab at 20 feet above street level, within the whole enclosure laid out and planted in an attractive manner, including a children's play space; and it will be accessible to both tenants and public. In due course it will be connected to, and form part of, the City upper level walkway system, at which time the top storey of the street level shop units can become the actual shops, whilst the street floor can change over to storage. At ground level, beneath the podium, there will be a service road to the shops in order to avoid vehicles unloading and waiting in the surrounding streets.

A Mezzanine floor over part of the service area road approached by double ramps gives easy access to some of the tenants' garages. A basement similarly served by double ramps and extending over most of the site, accommodates additional garage spaces, lock-up garages and storage basements to some of the shops. The scheme replaces seven blocks, five of which were erected in 1885 and two in 1927/8. The overall density was about 318 persons per acre—much in excess of the maximum density permitted by the current development plan. The blocks erected in 1885 had shared kitchens and lavatories. All of the blocks were designed without bathrooms, although there was a communal bath house on the estate.

The Court of Common Council decided not only to rebuild the estate, but in order to permit some of the tenants to remain in occupation until the new flats were available, to enlarge the site by compulsory purchase order under the Housing Acts. A block of temporary shops was also erected nearby to enable some of the shopkeepers being dispossessed to continue business until such time as they could move back into the new scheme.

**\* Both of G. H. Buckle & Partners**





Aerial view of the Middlesex Street Area of the City of London

Rebuilding will be carried out in four stages over a period of six years in order that tenants still in occupation can be moved directly into new flats in the first stages.

District heating over the whole site, with oil-fired boilers was decided upon, based upon a feasibility study prepared by the Consulting Engineers, which showed appreciably lower "cost-in-use" for this system than for alternative schemes.

The scheme provides for the installation of four modern packaged type boilers in the basement of the Tower building, two for heating, each rated at 3,500,000 Btus/hr and two for hot water supply, one rated at 1,250,000 and one at 1,000,000 Btus/hr, so as to provide the necessary flexibility to meet the varying load conditions.

The boiler plant is designed to be fired by pressure jet oil firing units burning fuel oil of 200 seconds viscosity, the draught conditions being controlled by means of motorized draught regulators. The chimney stack incorporates two flues, one for continual use and the other for winter operation, and on the top of these flues tapered terminals are designed to increase the efflux velocity to over 40 feet per second for maximum load conditions to eliminate downwash.

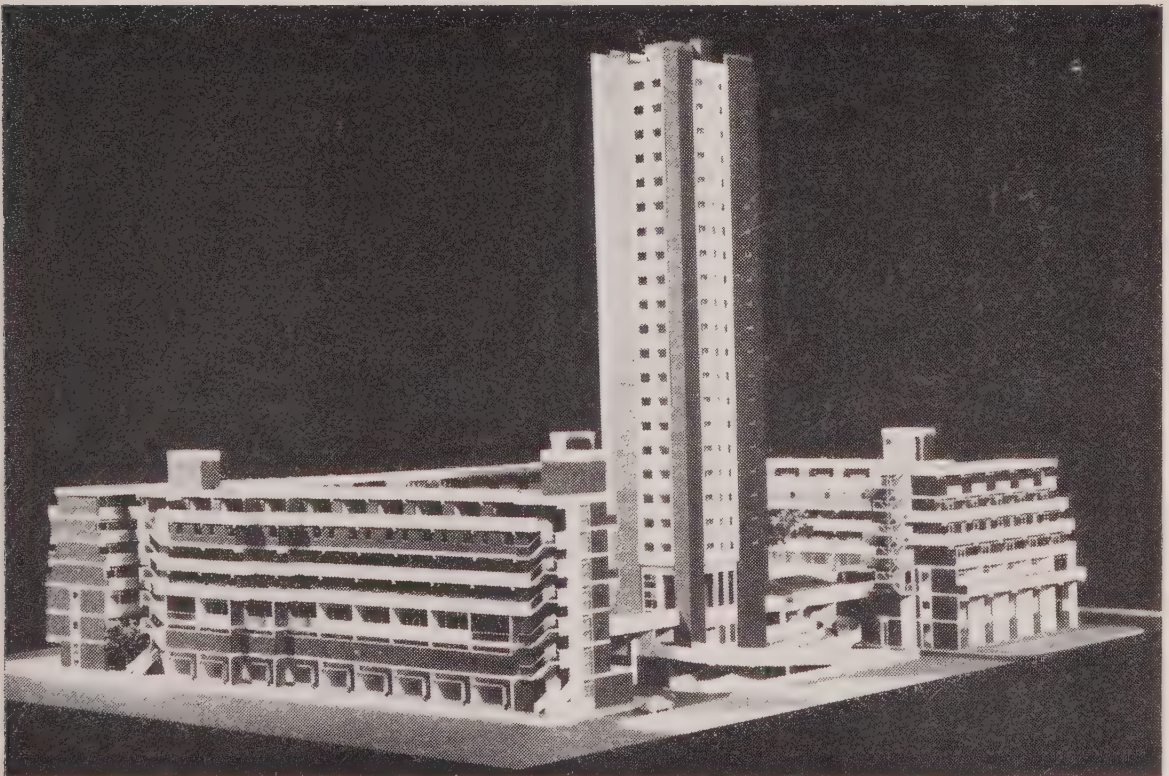
Smoke density indicator units are provided in the stack to work in conjunction with percentage indicators installed in the boilerhouse control panel.



The heating system is low pressure hot water, with distributing mains taken from the boilerhouse and run at high level in the basement car park, to serve risers all round the perimeter of the site for shops and perimeter dwellings and to vertical ducts to serve the Tower Block. The heating in the dwellings is by means of steel panel radiators, and in the shops by convectors. The choice of radiators for heating the flats was made after consideration was given to other alternatives including the use of central fan-assisted convectors. The final decision to use radiators was based on the grounds of more effective distribution of heat and of low maintenance cost.

The application of district heating will mean the elimination of something like 1,500 chimney flues with their widespread air pollution, and the installation in their place of one chimney stack incorporated in the tower building and terminating 25 feet above the top floor of the Tower Block.

It is interesting to compare the estimated emission from the chimney of the district heating system, with the probable emission from the existing flues. The figures for the normal maximum emission in winter for sulphur dioxide are: district heating—40 lbs. per hour and existing flues—150 lbs. per hour. For the latter figure, a consumption of  $3\frac{1}{2}$  lbs. of fuel per hour at each grate was assumed, a figure which might vary considerably. From these figures it will be seen that the total sulphur dioxide emission of the district heating chimney is something in the region of one quarter of the emission from the existing flues.



Model of the Redevelopment

The probable figures for grit and smoke emission are with district heating: 1 lb. per hour, compared with household grates burning smokeless fuel: 3.3 lbs. per hour, or, if burning household coal: 16.6 lbs. per hour. In any case, there is an appreciable reduction and in all a worthwhile change.

The Architect for the development is Mr. E. G. Chandler, F.R.I.B.A., M.T.P.I., City Architect and Planning Officer, Corporation of London, and the Consulting Engineers for the Engineering Services are G. H. Buckle & Partners.

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## **October Date set for Remaining Clean Air Act Provisions**

### **Minister makes Order**

Those provisions of the Clean Air Act, 1968, which have not yet been implemented will come into force on 1 October this year under an Order by Mr. Kenneth Robinson, Minister for Planning and Land.

Unless from a chimney, the emission of dark smoke from any industrial or trade premises—including premises on which matter is burnt in connection with any industrial or trade process—will be an offence from that date. Dark smoke from chimneys is already controlled by the Clean Air Act, 1956.

The Minister will be empowered to make exemptions by regulations—which he will publish in due course—to enable dark smoke-producing matter to be burnt in the open.

Other sections of the Act which are being brought into operation concern the fitting of plant to arrest grit and dust emissions from furnaces. At present, furnaces burning pulverized fuel or large furnaces burning solid fuel have to be fitted with local authority approved arrestment plant. This requirement will be extended to smaller furnaces and to those burning oil and gas. There are powers to exempt classes of furnace and individual furnaces which are not likely to give off any grit or dust.

In addition, the Minister will be able to apply the grit and dust provisions of the Clean Air Acts to fumes—for example smaller-than-dust solid particles which are given off by certain processes in the steel industry and other industries.

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## **MR. ARNOLD MARSH, O.B.E.**

**Sir Gerald Nabarro writes :**

I met Arnold Marsh 15 years ago in his capacity as the Director of the Smoke Abatement Society of Great Britain (now known as the National Society for Clean Air), an organization he had fashioned and developed during many years. He was a dedicated man, giving his utmost energies and all the great intellectual powers he possessed, also his wealth of scientific, technical and social knowledge, in pursuit of his ideal of ridding our atmosphere of poisonous and polluting elements.

He was responsible for bringing to my aid—and working closely with me to bring to fruition our mutual objectives—a wealth of facts and figures and evidence, from which we framed my original Clean Air Bill in 1955, incorporating most of the recommendations of the Committee under the Chairmanship of Sir Hugh Beaver, which reported in 1954.

Without the indefatigable help of Arnold Marsh and his helpers in the Smoke Abatement Society, we may have waited a very long time for the legislation which has done so much during the last 13 years to clean up heavily polluted air in our industrial areas, with consequential much improved health, lengthening and even saving of life, and, of course, great fuel conservation by improved combustion methods: truly a revolution at the fireside.

All this is a fine memorial to Arnold Marsh, a learned, kindly man, possessed of a deep social conscience.

I am proud to have been both his friend and his admirer. The world is a much poorer place without him.

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# INTERNATIONAL NEWS

## Second International Clean Air Congress, Washington, D.C., 6-11 December, 1970

A world-wide press release has been issued by the Air Pollution Control Association of Pittsburgh, Pa. regarding the Second International Clean Air Congress of the International Union of Air Pollution Prevention Associations of which the National Society for Clean Air is one of the founder members. The First International Congress was organized by the N.S.C.A. in London in 1966. The 1970 Congress at the Sheraton-Park Hotel in Washington will have as hosts the Air Pollution Control Association of America. The President of the Union is Dr. Christopher E. Barthel, Jr. and its Executive Secretary Mr. Arnold Arch.

Plans are under way for the largest exhibition of air instrumentation and air pollution abatement equipment ever shown anywhere. More than 300 exhibitors from all over the world are expected to display their wares and services. A full schedule of social events for international visitors is planned, and the attendance at the congress and exhibition is expected to exceed 5,000.

Representatives of 32 countries, including the Soviet Union, have already agreed to serve on the programme committee for submission of technical and professional papers.

### *Papers and Programme of Congress*

The programme committee invites submission of proposals to present papers at the Conference. The schedule for submission and review of proposals and papers is as follows:

July 1969-January 1970

Submission of proposals to present papers—  
Deadline: 31 January, 1970

February 1970-April 1970

Review of proposals by programme committee  
for acceptance—Deadline: 30 April, 1970.

May 1970-July 1970

Submission of papers—Deadline: 30 April,  
1970.

August 1970-November 1970

Translation, preprint preparation and re-  
production—preparation of final programme.

November 1970-December 1970

Preprint distribution and printing of final  
programme.

The Conference will consist of plenary sessions at which only specifically solicited papers, reports and speeches will be presented in either English, French, German, Japanese or Spanish, and at which there will be simultaneous translation into these five languages; and concurrent sessions for papers chosen from among those submitted in response to this invitation. The concurrent sessions will be limited to presentations and simultaneous translation in English and French, the two official languages of the International Union. Preprints will be in both languages.

It is planned to have concurrent sessions in the following six subject areas:

1. Air Pollution Chemistry and Physics—papers on sampling, analysis, instrumentation, aerosols, and on effects on non-biological systems.
2. Air Pollution Meteorology—Papers on transport, diffusion, modelling, forecasting and stacks.
3. Air Pollution Medicine and Biology—Papers on effects on people, animals and vegetation.
4. Air Pollution Engineering—Papers on sources, their engineering control and control equipment.
5. Air Pollution Control Administration—Papers on legislation, regulations, inspection and control programme operation.
6. Air Pollution Surveys—Papers reporting community and area studies.

Papers on air quality criteria will be assigned to "Air Pollution Medicine and Biology". Papers on air pollution standards will be assigned to "Air Pollution Control Administration". If enough papers on the social science aspects of air pollution are offered, a concurrent session series in this area will be considered.

The decision as to whether papers will be presented in their entirety, by abstract, or by title only will depend upon the number of sessions decided upon for each subject, and upon the number of papers accepted for each session.

Proposals to present papers should include a provisional title, for the paper, an outline limited to 200 words and the names, titles affiliations of the proposed authors and address of the principal author. Papers accepted for this conference may not be offered for publication elsewhere in English or French, the languages in which the Proceedings of the Conference will be published.

In the United Kingdom, proposals to present papers should be sent to:

The Director, (Papers Sub-Committee)  
National Society for Clean Air,  
Field House, Breams Buildings,  
London, E.C.4.

## **Annual Report of the International Union of Air Pollution Prevention Associations for Year Ending 30 June, 1969**

This report signed by the Union's current President, Dr. C. E. Barthel, Jr. views the year ending 30 June, 1969 as a significant one for the International Union. There were two categories of activities; the first consisting of general and administrative operations, the second, the planning of the second International Conference in Washington in 1970.



### *Maintenance of Secretariat*

The year saw progress in the main responsibilities of the Secretariat which include: improvement of communications, encouragement of membership by stimulating interest in the I.U.A.P.P.A. and liaison with international and national organizations.

In addition to the six charter organizations of the International Union (Argentina, France, West Germany, Japan, United Kingdom and U.S.A.), in 1966 the application for membership of the Clean Air Society of Australia and New Zealand was approved. In April 1969, the Executive Committee approved the application of the Asociación Mexicana Contra la Contaminación del Agua y Aire A.C.

The report mentions with deep regret the death of Mr. Arnold Marsh on 3 June, 1969. "As many of you know", writes Dr. Barthel, "he was a major contributor to the creation of the International Union, the organizer and director of the First International Conference in London in October 1966, recipient of A.P.C.A.'s Richard Beatty Mellon Award in 1967, and, above all, he was dedicated to air pollution control and a faithful and true friend of the A.P.C.A. and of the International Union."

The most significant activity of the year was a series of meetings of the Executive Committee in Dusseldorf 14 to 16 April, 1969. Among major actions taken were the following:

Reaffirmation of qualifications for full membership and creation of an affiliate type of membership;

Establishment of a Committee on Nomenclature and Standards as a Pilot committee operation;

Consideration of financial support of the I.U.A.P.P.A. and its operations;

Request for volunteers for organization and conduct of third general international conference and maintenance of Secretariat during the period 1971-1974;

Consideration of the establishment of a permanent Secretariat.

During the summer, the member associations of the I.U.A.P.P.A. will be officially requested to:

1. Approve a change in the constitution to create an affiliate membership;
2. Designate a member to the Nomenclature and Standards Committee.

In conclusion, the President expresses his personal satisfaction in having worked on the Executive committee of the Union and his gratification in noting the esteem with which the Association is held throughout the world.

Because of the substantial contribution of the A.P.C.A. funds and A.P.C.A. leadership, it is believed that a firm foundation has been established for the International Union. The President's personal thanks are extended to the members of the Executive Committee and the associations of the International Union, to the Officers and Directors of the Air Pollution Control Association, to many volunteers working towards the success of the 1970 Washington Conference and to Secretary Arch and his staff in Pittsburgh.

## SWEDEN

### **Gaol for those causing pollution**

Swedes guilty of pollution of one kind or another can be sent to prison for up to a year under a new law which came into effect recently. The law is concerned with air and pollution and with noise.

An extensive compulsory licensing system is being introduced for industrial and other concerns which may have a detrimental effect on the environment.

## ITALY

### **International Symposium on the Effects of Air Pollution on Human Health, Animals and Plants, Rome, Palazzo Venezia, 24-25 October, 1969**

An invitation to participate in the above symposium has been received by the Society from the Scientific Director, Prof. Aldo Barchiesi (00154 Roma, Via Odoardo Beccari, 105). He informs us that Italian research has been conducted on the harmful effects of air pollution resulting from uncontrolled industrial activities and that great concern is felt at the rise in the cancer of respiratory organs and mortality due to chronic bronchitis, in Italy as well as in other parts of the world. During a recent winter in Milan, two kilogrammes of benzpyrene have been found in the atmosphere.

The meeting of the International Symposium in Rome next October will be devoted to the study of scientific, technical and legal aspects of industrial air pollution. Representatives are expected from Eastern and Western countries—from governments as well as from universities, hospitals and private scientific sources.

Anyone interested to attend or to receive any documentation and information is requested to communicate with Prof. Aldo Barchiesi directly.

## U.S.A.

### **New Thermal Reactor**

The National Air Pollution Control Administration (N.A.P.A.C.A.) announced last April that it was joining with the National Aeronautics and Space Administration in a unique research undertaking designed to develop a new type of thermal reactor which could replace the conventional exhaust manifold of motor vehicles and dramatically reduce emissions of air pollutants in vehicle exhaust. The concept of a thermal reactor has been under study for several years. In development work to date by du Pont and the three major automobile manufacturers, the chief problem has been finding materials that can withstand the very high temperatures at which the reactor must operate to achieve maximum combustion.



# The Air Quality Act

John T. Middleton, Commissioner of the National Air Pollution Control Administration of the U.S. Department of Health, Education and Welfare, addressed a meeting of businessmen at Cincinnati recently. His speech was devoted to an explanation of the Air Quality Act which he described as an opportunity for government, industry and the public to participate in making the critical decisions that will decide whether air comes to us polluted or not.

He referred to those who felt that the answer was for the Government to set up a super agency that would not only do away with air pollution but with all other environmental problems as well—an impractical dream probably originating in the hope that turning all such problems over to the super experts would allow the others to get on with business as usual. Problems of environmental pollution were too complicated and too far reaching for this, and solving them would take the efforts of not just one agency but every agency of government; not just one level of society but all levels—nothing short of a co-ordinated effort by Federal, State and local authority, industry and labour, scientific and professional groups, universities and the general public.

He went on to emphasize that the Air Quality Act recognized the fact that neighbour city could pollute neighbour or adjacent suburbs, and therefore the problem must be controlled on a regional basis with special emphasis on the two important pollutants, the sulphur oxides and particulate matter. By 1970 it was anticipated that 57 air quality control regions would have been designated. The combined population of these areas would be about 97 million, a little more than 70 per cent of the total urban population of the United States. Three months would be allowed to give notice of intent to establish standards, six months to hold public hearings and complete the standard setting process, and another six months to develop implementation plans. He appealed to industrialists, of whom a great many were in the audience, to make their viewpoints and positions known.

Besides having a personal stake in the continued growth of the U.S. economy they had a very personal stake in America's health and welfare and in protecting the environment upon which all of life depends, he said, and quoted John Kenneth Galbraith's comment related to the need for maintaining a balance in our thinking between economic and social considerations, "It is hard to suppose that penultimate Western man, stalled in the ultimate traffic jam and slowly succumbing to carbon monoxide, will be especially enchanted to hear from the last survivor that in the previous year, the Gross National Product went up by a record amount".

Mr. Middleton concluded his speech by saying that the major ingredients in the effectiveness of national and local action would be the attitudes of public officials and citizens. If the citizens truly want clean air—and if officials and the political decision makers recognize this—they would be on their way to winning the fight against polluted air.

"It is time, then, for all of us to be making our own decisions—not just in our professional capacities, but as private citizens as well—about the quality of the air we want to live with, and about the kind of regulations that will be needed to ensure that this quality is not only achieved in a reasonable period of time, but also maintained throughout future community growth and development."

### Air Pollution Committee of the Board of Health

The Minister of Health of New Zealand has requested that the Board of Health Air Pollution Committee be re-established with the following terms of reference: To consider the adequacy of existing air pollution legislation and to make recommendations to the Board of Health and the Minister of Health.

The Committee will be Chaired by Dr. H. B. Turbott, retired Director of the N.Z. Department of Health. Other members are R. T. Douglas, Chief Chemical Inspector, Prof. A. M. Kennedy, Professor of Chemical Engineering, University of Canterbury, J. E. Fitzgerald, Mt. Wellington Borough Council, Dr. J. F. de Lisle, N.Z. Meteorological Service, A. P. Milthorpe, Christchurch Regional Planning Authority, Dr. S. Hickling, University of Otago, L. Evans, Victoria University, R. Hicks, Auckland Regional Authority, P. M. Outhwaite, Institute of Fuel and one representative from New Zealand Manufacturers' Association. Persons or representatives of organizations with specialized or local interests are to be co-opted by the Committee as and when required. The Secretary is C. F. Wilcox of the Department of Health who will be assisted in technical matters by R. T. Douglas.

The Committee met for the first time in December 1968 when the background to the air pollution problem was considered in detail by Mr. Douglas and others. The existing situation in Auckland and Christchurch would be the first matter for attention, and besides reports from the Planning Authorities of the two cities, it was agreed to invite submissions from Clean Air Societies.

## REVIEWS

### **105th Annual Report on Alkali, etc. Works 1968**

*The Chief Inspectors, 84 pages, H.M.S.O. 9s. 6d.*

As ever, the report of the Chief Inspectors is well worth reading and is a mine of interesting and useful information.

In spite of the fact that for the third year in succession the Inspectorate had to proceed cautiously in the enforcements of its requirements in industries feeling the effects of the country's economic situation, there is real progress to report. Works installing new production plant have been prepared to guard the local amenity of the future. Nevertheless, the number of works concerned with specific complaints investigated during the year, largely at the request of local authorities was 405. Of the 405 works, 290 were registered under the Alkali Acts, and 115 were unregistered. So far as the registered works were concerned, complaints were most numerous against ceramic works, iron and steel works, gas and coke works, electricity works and cement works. In this connection it is interesting that at the forthcoming Clean Air Conference there will be sessions on ceramic works, iron and steel works, and cement works.



The report stresses that the passing of the Clean Air Act 1968 was one of the major items of legislation in the clean air field for some years: it points out that the new Act impinges on the Alkali Act in two ways (a) by placing on the Inspectorate the onus for making the final decisions on chimney heights for scheduled works from the point of view of public health and amenity, and (b) removing from local authorities the power to prosecute scheduled works with the permission of the Minister. "As the threat of penal sanctions open to local authorities against defenders registered under the Alkali Act has been removed, the Inspectorate is bound to take a more positive look at its own powers of prosecution. At the year end preparation had been made to take legal action against another metal recovery works early in 1969."

The report contains a very interesting section on the cost of air pollution control. It points out that for many years attempts have been made to put a cost on the benefits of air pollution prevention and mentions that Sir Hugh Beaver's revised estimate was of the order of £350 million per year. "We have often listened to pleas for preventing the emissions of sulphur dioxide to air. The possible ways in which this can be achieved are by desulphurization of fuels or removal of sulphur dioxide from waste gas streams. Desulphurization of coal is a non-starter, but it is technically possible to reduce the sulphur in residual fuel oil, of which this country consumes about 30 million tons per year. In addition to the enormous capital cost of new plant, it is estimated that the annual cost for the country for reducing the sulphur content of fuel oil to below 1 per cent and thereby preventing the escape to air of about 1.2 million tons per year of sulphur dioxide, would be about £45 million." The report then asks, when this is compared with the total of  $6\frac{1}{2}$  million tons of sulphur dioxide emitted annually from all sources in Britain, if this is the best way in which the country can spend this amount of money. It was with such considerations in mind that the Chief Alkali Inspector has endeavoured to assess what amounts scheduled works are spending on air pollution control. The resultant figures are indeed interesting. The cement industry for example is already in the course of spending over £4½ million on new control equipment, and it is estimated that a further £7½ million would be needed to bring existing works up to the highest standards. The British Steel Corporation is spending £7 million up to 1970. In the Fletton brick industry, to improve dispersion by increasing chimney heights to a minimum of 225 feet, it is estimated would cost the industry £3 million.

The C.E.G.B., however, is the country's biggest single spender on air pollution control, and it is estimated that the capital cost of air pollution control equipment on a 2,000 mw station is nearly £4 million. In the case of ceramic works assessment is rather more difficult as this is a case of industrial revolution effecting estimates. Many kilns have been closed in the past ten years and no records are available. "Changes have been made under pressure from the Inspectorate and automatic stokers and oil firing are popular. What fraction of these costs is chargeable to air pollution control?" Over the past ten years, it is estimated that industry has been spending an average of £32 million a year on air pollution control.

The greater part of the time of the Inspectorate is directed to those operations which are registered under the Act, but 490 visits were paid in connection with operations not connected with Alkali Act and 46 with radioactive emissions. In

the case of unregistered premises, enquiries were normally carried out in collaboration with officers of the local authorities concerned. It is of interest that many of these visits were concerned with the emission of unpleasant odours. With regard to radioactive emissions, the report makes the point that no public health hazard has arisen.

In England and Wales there are now 1,793 premises registered under the Act involving 2,970 separate processes. 9,474 visits were paid in all to registered and unregistered works.

In Scotland, 212 works are registered and during the year 619 visits and inspections were made of works under the Act, and a further 66 visits were made in connection with related work in air pollution control.

### **New Booklet on Mintech**

*Ministry of Technology London and Regional Offices.*

The wide range of the Ministry of Technology's activities in relation to its extended responsibilities in recent years is described in a new booklet recently published. The booklet traces the development of Mintech from its creation in October 1964 to the present day, highlighting the additional responsibilities which it has assumed over the five-year period. The report includes details of the organization of the Ministry and the advisory services for industry that have been created or are supported by Mintech.

### **For Cleaner Air and Water**

*Standard Oil Co. (Indiana) Ltd.*

In describing the Company's operations, exploration and production, transportation and refining, the booklet goes into great detail to explain the techniques and disciplines involved in maintaining the high standard of control laid down with regard to both air and water quality.

However, it is the section devoted to the automobile that makes the most impressive reading. Initially it estimates the total pollution discharged into the American skies as 165,000,000 tons and states that a large portion of this is produced by automobiles. The emission of hydrocarbons and carbon monoxide has been reduced by 60 per cent since control devices were added in the early 60's and oil companies and the automobile industry are working together to eliminate the remaining pollutants and produce a virtually pollution-free car for the motorist of the seventies.

How this is being done is described and illustrated in considerable detail, the ultimate goal being to produce engine performance which eliminates 95 per cent of pollution by achieving complete combustion and the remaining 5 per cent by preventing fuel evaporation from the petrol tank and the carburettor. The costly studies being pursued to achieve this goal indicate that the internal combustion engine is on the verge of transformation into a virtually pollution-free source of power. Alternative transport is dismissed rather perfunctorily in the following sentence, "As for steam cars, electric cars, gas turbines, and engines using liquified natural gas, they are most likely to find their place in the years ahead as second cars or for specialized uses".



**W.M.O. Technical Note No. 96—Air Pollutants, Meteorology, and Plant Injury**  
*E. I. Mukammal, C. S. Brandt, R. Neuwirth, D. H. Pack and W. C. Swinbank.*

W.M.O. Technical Notes vary greatly in quality. Some put over an urgent message with zeal, others illustrate their topic profusely with photographs and diagrams. This one does not argue its theme, nor does it get involved in details but is content with a shallow review of very numerous references between which it does not usefully discriminate. It does not propose a brief reading list, which would have been useful and one can only suppose that this Working Group either did not wish or was not unanimous enough to give very specific guidance, or was briefed to do otherwise.

The various important pollutants are listed and their effects on vegetation very briefly described. There is very little chemistry and no pictures of damage. No-one could possibly distinguish the different kinds of damage and their causes on the basis of these verbal descriptions: since pictures are available and could have been reproduced it is a pity none were. There is little discrimination in the descriptions. For example one could not discover the relative importance of ethylene and hydrogen sulphide whereas these two substances have quite different histories and futures, as air pollutants affecting vegetation.

Quite a large section describes the influence of the atmosphere on the behaviour of pollution. Again no diagrams or pictures are given where they would have brought the subject to life. Such diagrams as are given illustrate theory, not practice, and several pages are given to quite unreliable and thoroughly misleading dispersion calculations. These words are used deliberately, and represent a controversial viewpoint: meteorologists use computational methods for the very broadscale features of the atmosphere in their forecasting but never in their predictions for small regions. These forecasts are based on physical insight, experience of attempting previous forecasts, and extensive measurements; it is ridiculous to expect to predict air pollution by any other method since it is more influenced by complex local and temporary meteorological and topographical features than the weather itself.

It seems that engineers, chemists, physicists, planners etc. are expecting to calculate air pollution and its effects by methods of a kind which a meteorologist would never employ to make weather forecasts, and it is time the nonsense was stopped.

The discussion of control measures is extremely superficial and obvious, and as a result scarcely worth including. It does not say anything about legislation or the associated economic and administrative problems.

Air pollution is really no-one's sole and full responsibility. We study it primarily because it is costly and we want to do something about it, but it is not a career subject like meteorology, agriculture, veterinary science, or town planning. Consequently the advice given to the legislators is not as good as it could be, and the scientific effort is intermittent and rather unorganized.

Unfortunately, this report has a style whereby it does not argue its case, because it has not really got one, except in the one case mentioned above, and over which I disagree strongly. It reviews an extensive literature without giving a message. I do not have in mind the obvious message that we ought to do something about the damage by air pollution. It has no clear message about how we

ought to proceed. In my view there is a very obvious need for more routine forecasting of the details of air pollution, otherwise no-one will ever learn what is really going on. At present millions of measurements are being made and collected in cupboards and never digested by any human mind. For reasons given above computers can only produce results by obscuring difficulties and details. But if any mind is to tackle this problem it must have a clear mental picture from personal field experience of what is going on. One does not have the impression from this report that the authors had such a picture to convey about damage to vegetation.

R. S. Scorer

### **Electricity in the North of Scotland**

*Report and Accounts of the North of Scotland Hydro-Electric Board, H.M.S.O. 8s.*

The North of Scotland Hydro-Electric Development (Scotland) Act was put on the Statute Book in August 1943 and the Board celebrated its 25th anniversary last August.

The Board was established to undertake, for public electricity supply, the development of water power in the Highlands and Islands. But in addition, the Board has the duty—unique in the electricity supply industry—to collaborate in the economic and social improvement in its area.

The area supplied by the Board covers 21,630 square miles, about one quarter of the area of Great Britain, but with a population of only 1,154,000. The average consumer density is 21 per square mile compared with 306 per square mile in England and Wales.

Under the Electricity Act of 1947, which nationalized the industry throughout Great Britain, the Board took over 16 local authority and company undertakings with a capacity of 230,000 kw and 188,624 consumers.

The Board now has in operation 54 hydro-electric stations with a capacity of 1,000,000 kw, a pumped storage of 809,000 kw, two steam stations of 301,000 kw and five diesel stations in the Outer Isles of a capacity of 40,020 kw. During the year the old coal-fired station at Aberdeen was closed down.

The Board sold 3,747 million units, an increase of 11·8 per cent, at an average price of 1·845d. a unit, to 364,558 domestic users, 16,654 crofts, 18,294 farms, 46,880 commercial users, 7,626 industrial users and 432 public lighting systems.

The Board's income, including that from sales of appliances, amounted to £31·5 million while expenditure amounted to £32·9 million resulting in a deficit of £1·4 million.

Hydro-electric plant can suffer from two disabilities—shortage of water and in a severe winter, frozen water supplies. In the year under review, the Board suffered severely from a shortage of water due to the rainfall in their catchment area being 71 per cent only of the long-term average—in contrast to 105 per cent



in the previous year. As a consequence, the output from hydro stations, augmented as far as possible by drawing down water from the dams, was much below average and had to be made good by additional output from thermal stations at a considerable cost. As a result the trading surplus was below estimate and amounted to £12·3 million: after interest and other charges, amounting to £13·7 million, there was a net loss of £1·4 million.

The electricity sent out from hydro stations amounted to 2,248 million units; from steam stations 1,255 million units; from diesel stations 113 million units, and 736 million units were imported from the South of Scotland Board. In contrast, during the previous year 882 million units were exported to the South of Scotland Board.

Capital expenditure during the year amounted to £7·7 million bringing the total at the end of March 1969 to £321 million; for distribution £78·9 million, and for sundry services £5·1 million.

Supplies of electricity are now given to 96 per cent of all premises in the Board's area, including the islands. The Board's aim is to encourage the greater use of electricity, particularly in industry, and to introduce off-peak heating.

The Board has concluded an agreement with the British Aluminium Company to supply power to a 100,000-ton smelting plant at Invergordon, which will take some 200 mw from the grid.

Planned jointly by the Board and the South of Scotland Board, it is proposed to construct a joint hydro and pumped storage scheme of 300 mw at Foyers in Loch Ness, to follow this by a thermal station at Inverkip on the Clyde coast, and later by a thermal station in North East Scotland.

The Board has 464 circuit miles of 275 kv overhead transmission lines in service, and 2,077 circuit miles of 132 kv lines.

*A. J. Cousins*

## **Twelfth Annual Report, Warwickshire Clean Air Council**

*The Lawn, Newbold Road, Rugby.*

The Warwickshire Clean Air Council were recently mentioned on B.B.C.-1 Television—"Midland Today", Mr Tom Coyne quoting their statement that there was insufficient concern at Government level over air pollution by vehicle exhaust fumes.

The Council had said that experiments it tried in Atherstone and Warwick proved how faulty or badly-used diesel engines could pollute the air. Mr. Coyne went on to say that it was felt that stronger legislation was necessary but, meanwhile, the police should use their existing powers more fully.

The 12th Annual Report of the Council contains an introduction by Mr. H. L. Williams, the Chairman, in which he states "the unanimous view of the Council is that this invidious invasion of our amenities should be curbed by legislation at an early date". In the report of the Technical Advisory Committee of the Council that follows, the decisions made regarding air pollution from road vehicles are listed. One being "that the proper course to be taken when considering

the effects on environmental health of road vehicle pollution should be an assumption that only unless the contrary is proved such pollution does form a danger to environmental health" and goes on to urge the Government to take legislative measures to overcome the dangers caused by faulty diesel engines polluting the atmosphere.

This resolution, together with six others, was sent to the Ministries of Health, Housing and Local Government, Technology, Transport and the Society of Motor Manufacturers and Traders, and their comments invited. The Council considered that the replies received from these bodies were very disappointing.

The activities of the Council's Publicity Group and the Pollution and Measurement Group are described, and a short history of the Council by B. D. Allen and R. K. Crow, makes impressive reading.

### **Coalite and Chemical Products Ltd. Report and Accounts 1968/69**

In this report, the Chairman, Commander Colin Buist, C.V.O., R.N., states that Coalite are now seeing the results of much hard work, planning and extensive capital expenditure in recent years. Substantial new records were established in production, sales and profit. This was due in no small way to the loyalty and hard-work of an efficient team of employees, and the Chairman thanks them all on behalf of the Board.

The trading profit of the Group increased from £2,955,459 to £4,390,018 after providing for £8,536 interest on the bank overdraft during the early days of the period. The increase of 48.6 per cent reflects the benefit now being derived from the large new Coalite works at Grimethorpe. In the report of the Directors, it is stated that "the principal activity of the 'Coalite' group is the same now as it has been for the past 52 years, namely the production and marketing of the reactive solid smokeless fuel 'Coalite'."

### **Clean Air for Teesside**

*Issued by the Health Committee of the County Borough of Teesside*

Teesside, as is well known, has its air pollution problems. This booklet, however, sets out to educate the householder and to put fairly before him the problems of air pollution and what he, the householder, can do to improve the situation. It does not blink the facts and sets out very clearly the old argument, often presented by some members of the public, that no attempt should be made to control pollution from domestic sources until all problems of industrial pollution are solved. Industrialists, on the other hand, have grumbled that local authority progress in dealing with domestic smoke has lagged behind their progress in dealing with industrial smoke. This booklet makes it quite clear that the Health Department of Teesside recognize all air pollution as being injurious to health, comfort and amenity and that it is an evil which should be attacked simultaneously on both industrial and domestic fronts. The Health Department believe that it lies within the choice of the householder drastically to reduce the amount of impurities in the air breathed.



It is calculated that something like £5 million has already been spent by industry on Teesside on the reduction of pollution since 1956. Plans have been prepared for the expenditure of even greater sums in the future, and indeed one firm has indicated that it expects to spend £30 million in the next few years. The book then goes on to give some facts of atmospheric pollution; it discusses the cost of air pollution and outlines the major causes. It then considers in rather more detail what can be done to prevent air pollution and examines the present position in Teesside and what is now being done there. It recognizes that Teesside is a heavily industrialized area containing many iron and steel works, the largest chemical works complex in Europe and a growing petro-chemical industry. It discusses the local phenomenon known as the Teesside mist which gives rise to considerable nuisance in some parts of Teesside. Although it is not yet fully understood if some forms of local pollution cause mist themselves, there is no doubt of the evidence of sea mist at the coast and in the lower reaches of the river when this particular Teesside mist forms. This Teesside mist is being investigated by the Ministry of Science and Technology.

The booklet then describes in detail the machinery for the setting up of smoke control areas and how it affects the householder himself. This is very clearly set out and any householder who reads the booklet should know exactly how he will be affected and what he has to do.

On 1 April, 1969, in the new Teesside County Borough, out of 122,000 houses only 32,100 were in smoke control areas. The new Borough Council intend to progress the task of extending these areas as quickly as possible and they have prepared a detailed plan for the next five years. This provides for a further 23,000 existing houses being brought into smoke control areas, and also by covering areas where new house building is anticipated, it is expected that the overall total for the five-year period will be approximately 30,000. As a result of this the Health Authority expect that by 1973 half of the town will be subject to smoke control.

This is an excellent little publication, but it is only what one would expect from a Health Committee whose Chairman is Alderman J. A. Brown. In this respect the newly-formed Teesside Council is indeed fortunate. Alderman Brown has given long and distinguished service to the cause of clean air. He was a founder member of the very active Teesside Clean Air Committee and was for some years a member of the Ministry of Housing and Local Government's Clean Air Advisory Council.

## **Air Pollution**

*Report of the Working Party of the European Federation of Chemical Engineering, and Directory of the Establishments in Europe engaged on Air Pollution Research. The Institute of Chemical Engineers, 41 pages, 30s.*

This booklet is in two parts, the first being a report of the International Working Party together with seven specific papers summarizing the information available to the Working Party on the emission and control of the pollutants considered at the Technical Sessions, and second a comprehensive directory of research establishments in Europe.

The Directory of Establishments has been compiled from the information actually supplied to the Working Party and is a comprehensive list, although by no means exhaustive.

The specific papers are: a report on the removal of grit, dust and fumes from effluent gases, pollution by oxides of sulphur, a report on methods for the removal of sulphur dioxide from flue gases, emissions and abatement of oxides of nitrogen in nitric acid manufacture, fluorine emission at aluminium works, fluoride emission from fertilizer production, and a report on the elimination of mal-odour emissions in the chemical industry.

In its conclusions, the Working Party points out that it has reviewed the general position of air pollution arising from process industries in the individual countries represented and continues that the position regarding the order of importance of the various pollutants and the measures taken to prevent, abate or mitigate emissions is similar in all countries. From this it is clear that maintenance of liaison and exchange of information on both research and medical aspects will be of considerable benefit to all concerned and should be encouraged. Further, it considers that the information in the Directory should be made generally available and circulated in a suitable form.

The Working Party consider that ideally, international standards for air quality criteria would seem to be the solution, but agrees that in practice there are many difficulties caused by differences of all kinds. In spite of this, however, there is a need for international guidance, but any values recommended must be based on sound scientific investigations. The Working Party consider the high standard of plant design, control and servicing must be maintained to prevent uncontrolled but avoidable emissions. Ideally, positive screening of all reaction and conveying equipment is particularly important for organic processes where there is a risk of odour emission which can create a nuisance at extreme low concentrations.

The discussions of the Working Party have shown once again that, in general, the elimination of pollutants is hampered by economic rather than technical considerations. It reiterates, however, that in the present state of knowledge the economic appraisal is incomplete, since, although accurate estimates can be made of capital expenditure and the operating costs of abatement, it is not possible to assess fully the cost of the damage caused by the emission of pollutants.

Pollution by sulphur dioxide, emitted mainly from combustion plants, is considered by the Working Party to be a major problem in all countries. Despite sustained research efforts, no really satisfactory method of removing it from exhaust or flue gases has been found and reliance has still to be placed on dispersion by chimneys of adequate height. The report believes that there should be no relaxation in research work towards solving this problem.

It is perhaps significant that the Chairman of the Working Party is Mr. F. E. Ireland, the Chief Alkali Inspector, and the report in its last paragraph concludes that in the control of chemical plant emissions, application of the best practicable means of abatement should ensure maximum removal of pollutants from waste gases before their entry into the chimney.



**Estimating the heat requirements for domestic buildings**  
*J. J. Barton, 144 pages, Newnes-Butterworths, 15s.*

Described as a reference book for domestic heating engineers, architects and builders, this handy little volume sets out clearly all the basic factors affecting the heating of domestic buildings with all the necessary formulae and calculations simply explained. It then goes on to present heat load design information in tabular form to assist the installer.

The book contains a wealth of information which is well indexed. Although intended mainly for use by the busy domestic heating installer, the book is readily understandable to the layman—or housewife. To anyone contemplating installing central heating in their home, the expenditure of 15s. on this book will be money well spent.

# SMOKE CONTROL AREAS

## Progress Report

Position at 30 June 1969—TOTALS

*(Figures supplied by Ministry of Housing and Local Government)*

	England	Wales	Scotland	Northern Ireland
Smokeless Zones (Local Acts) in Operation ..	44	—	1	—
Acres, 3,400 .. ..				
Premises, 41,060 .. ..				
Smoke Control Areas in Operation .. ..	2,819	6	124	13
Acres .. ..	717,615	418	67,296	5,618
Premises .. ..	3,750,149	2,352	315,029	4,791
Smoke Control Orders ..				
Confirmed .. ..	257	1	17	7
Submitted .. ..	68	—	3	2
Grand Totals ..	3,188	7	145	22

**Smoke Control Position in Regions of England**  
**at 30 June 1969**  
*(Figures supplied by Ministry of Housing and Local Government)*

(1)  Region	(2) <i>No. of black area acres covered by smoke control orders con- firmed or awaiting decision</i>	(3) <i>Percentage* of total black area acreage in region so covered</i>	(4) <i>No. of black area premises covered by smoke control orders confirmed or awaiting decision</i>	(5) <i>Percentage* of total black area premises in the region</i>
Northern .. ..	30,180	24.08	135,875	24.57
Yorkshire and Humberside ..	162,743	43.22	552,725	47.33
East Midlands ..	52,442	19.54	163,718	31.99
Greater London ..	222,499	68.04	1,970,920	74.67
North Western ..	170,806	42.57	737,195	43.29
West Midlands ..	76,877	30.87	339,642	32.30
South Western ..	7,201	27.33	26,650	17.89
Total (black areas)	722,748	40.75	3,926,725	50.50
Outside black areas	131,485		430,590	
GRAND TOTALS	854,233		4,357,315	

\* The percentage shown in columns (3) and (5) above are percentages of the *total* acreage and of the *total* number of premises in the black areas concerned. In practice it may not always be necessary for the whole of the black area authority's district to be covered by smoke control orders (e.g., there may be some areas of open country).  
NOTE—Statistics in respect of Wales and Monmouthshire are no longer included.

## NEW SMOKE CONTROL ORDERS

*The lists below are supplementary to the information in the last issue of Smokeless Air (Summer 1969) which gave the position up to 31 March, 1969. They now show changes and additions up to 1 July, 1969.*

*Some of the areas listed are new housing estates, or areas to be developed for housing. The total number of premises involved will therefore increase. An asterisk denotes that there have been objections and that a formal inquiry has been or will be held.*

*The list of new areas in operation of smoke control is based on the plans submitted to the Ministry of Housing but may erroneously include some local authorities who have made postponements, without notifying the Ministry of the fact.*

### ENGLAND NEW SMOKE CONTROL ORDERS IN OPERATION

#### Northern

*Tyneside and Wearside*

Newburn U.D. Nos. 9 and 10.

*Teesside*

Billingham U.D. No. 6. Middlesbrough C.B. (The Avenue, Keith Regent and Sutton.)

#### Yorkshire

*West Riding (North)*

Aireborough U.D. No. 24. Batley B. No. 7. Bingley U.D. No. 15. Bradford C.B. Listerhills. Brighouse B. No. 13. Elland U.D. (Stainland No. 3). Halifax



C.B. No. 15. Knottingley U.D. (Wentcliff Hill). Knottingley U.D. (Hill Top). Leeds C.B. Nos. 71-73. Morley B. Nos. 36 and 37. Pudsey B. No. 7. Spenborough B. No. 9. Stanley (Yorks) U.D. No. 2.

#### *West Riding (South)*

Barnsley C.B. No. 9. Doncaster C.B. No. 10. Rotherham C.B. (St. Ann's Road No. 1). Rotherham C.B. (Greasbrough No. 2). Sheffield C.B. No. 23.

#### **North Western**

##### *South Lancashire and North-East Cheshire*

Bolton C.B. (Deane No. 2). Bolton C.B. (Derby Ward No. 3). Bolton C.B. (West Ward No. 4). Bolton C.B. (Ladybridge No. 2). Bolton C.B. (Morris Green). Bury C.B. No. 7. Chadderton U.D. Nos. 10 and 11. Dukinfield B. No. 13. Eccles B. No. 8B. Eccles B. No. 9. Irlam U.D. (Irlam No. 3). Leigh B. No. 6. Prestwich B. No. 8. Salford C.B. No. 16. Stalybridge B. (Copley, Millbrook, Larrbrook, Harridge). Stalybridge B. (High Street No. 2). Stalybridge B. (Set Street and Sycamore Street). Stockport C.B. (Portwood/New-bridge Lane). Urmston U.D. No. 7. Wigan C.B. No. 5.

##### *Central Lancashire*

Brierfield U.D. No. 3. Padiham U.D. No. 9.

##### *Merseyside*

Bebington B. No. 12. Bottle C.B. (Sefton Estate). Bootle C.B. No. 9. Huyton-with-Roby U.D. No. 5. St. Helens C.B. No. 6. Warrington C.B. No. 12.

#### **Midlands**

##### *Derby, Nottingham and Chesterfield*

Arnold U.D. No. 2. Carlton U.D. Nos. 3 and 4. Chesterfield R.D. No. 10. Sutton in Ashfield U.D. No. 1.

##### *West Midlands*

Dudley C.B. Nos. 52 and 53. Sutton Coldfield B. Nos. 11 and 12.

##### *Potteries*

Stoke on Trent C.B. Nos. 21 and 22.

#### **London**

##### *Greater London Boroughs*

Barnet L.B. No. 8. Croydon L.B. No. 10. Ealing L.B. Nos. 38 and 39. Harrow L.B. No. 17. Hillingdon L.B. No. 11. Merton L.B. Nos. 9 and 10. Waltham Forest L.B. No. 14.

#### **Local Authorities Outside the Black Areas**

Bedford B. Nos. 5 and 6. Canterbury C.B. (Military Road No. 1). Cheshunt U.D. No. 5. Crawley U.D. (Northgate). \*Crewe B. No. 4. Exeter C.B. (Stoke Hill No. 2). Exeter C.B. (Cowick Lane No. 3). Grantham B. No. 14. Hemel Hempstead

(Chaulden No. 2). Norwich C.B. No. 1. Reading C.B. No. 12. Runcorn R.D. No. 2A. Staines U.D. No. 9. Thurrock U.D. No. 6. Whiston R.D. No. 1.

#### **NEW SMOKE CONTROL ORDERS CONFIRMED BUT NOT YET IN OPERATION**

##### **Northern**

##### *Tyneside and Wearside*

Boldon U.D. Nos. 14-16.

##### *Teesside*

Hartlepool C.B. No. 15.

##### **Yorkshire**

##### *West Riding (North)*

\*Bingley U.D. No. 14. Elland U.D. West Vale. Keighley B. No. 7. Leeds C.B. Nos. 76 and 77. Rothwell U.D. No. 13. Wakefield C.B. St. John's No. 1. Wakefield C.B. Sandal No. 3.

##### *West Riding (South)*

Dearne U.D. Dearne No. 5.

##### **North Western**

##### *South Lancashire and North-East Cheshire*

Dukinfield B. No. 15. Farnworth B. No. 4. Heywood B. No. 9. Leigh B. No. 10. Middleton B. Compton Way No. 15. Stockport C.B. Adswold, Davenport. Swinton and Pendlebury B. No. 6. Urmston U.D. No. 9. Westhoughton U.D. No. 5.

##### *Central Lancashire*

Rishton U.D. Nos. 2 and 3.

##### *Merseyside*

Bebington B. No. 13. Huyton-with-Roby U.D. No. 6.

#### **Midlands**

##### *Derby, Nottingham and Chesterfield*

Alfreton U.D. No. 4.

##### *West Midlands*

Aldridge-Brownhills U.D. No. 28. Birmingham C.B. No. 156. Dudley C.B. Nos. 55-57. Halesowen B. No. 30. Sutton Coldfield B. No. 15.

##### *Potteries*

Stoke-on-Trent C.B. No. 23.

#### **London**

##### *Greater London Boroughs*

Ealing L.B. Nos. 43 and 44. Havering L.B. No. 5. Lambeth L.B. No. 22. Merton L.B. No. 13. Richmond-upon-Thames L.B. Richmond No. 10. Sutton L.B. No. 20. Wandsworth L.B. No. 3.

#### **Local Authorities Outside the Black Areas**

Basildon U.D. No. 8. Blackburn R.D. No. 2. Chatham B. No. 5A. Chatham B. No. 6. Cheltenham B. No. 6. Flaxton R.D. Nos. 1-3. Grantham B. No. 18.

Marple U.D. No. 2. New Windsor R.B. No. 1. Oxford C.B. Nos. 8 and 9. Rugby B. No. 12. Scunthorpe B. No. 8. Slough B. No. 13. \*Swadlincote U.D. No. 1. Warrington R.D. No. 3. Whiston R.D. No. 3.

**NEW SMOKE CONTROL ORDERS  
SUBMITTED BUT NOT YET  
CONFIRMED**

**Northern**

*Tyneside and Wearside*

Gateshead C.B. No. 13. Newburn U.D. No. 11.

*Teesside*

Hartlepool C.B. No. 16. Teesside C.B. No. 4.

**Yorkshire**

*West Riding (North)*

Baildon U.D. No. 11. Bradford C.B. North West. Horbury U.D. No. 7. Leeds C.B. Nos. 78 and 79. Morley B. Nos. 38-41.

*West Riding (South)*

Barnsley C.B. Nos. 10 and 11. Cudworth U.D. Nos. 1 and 2. Sheffield C.B. No. 17. Wath-upon-Deane U.D. No. 4.

**North Western**

*South Lancashire and North-East Cheshire*

Altrincham B. No. 8. Blackrod U.D. No. 1. Bolton C.B. Great Lever. Golborne U.D. No. 2. Prestwich B. No. 9. Sale B. No. 10. Salford C.B. No. 14. Salford C.B. Wallness. Stalybridge B. Grey Street, Stocksland and Mottram Road. Wigan C.B. No. 7.

*Central Lancashire*

Accrington B. No. 9. Burnley C.B. No. 11. Preston C.B. No. 21.

*Merseyside*

Warrington C.B. No. 13.

**Midlands**

*Derby, Nottingham and Chesterfield*

Alfreton U.D. No. 3. Arnold U.D. No. 3. Dronfield U.D. No. 5.

*West Midlands*

Sutton Coldfield B. No. 14.

*Potteries*

Kidsgrove U.D. No. 16.

**London**

*Greater London Boroughs*

Barnet L.B. No. 10. Harrow L.B. No. 20. Merton L.B. No. 14. Westminster L.B. Paddington Church. Westminster L.B. Hyde Park No. 2.

*Outer London*

Dartford B. Nos. 8 and 9.

**Local Authorities Outside the Black Areas**

Barnoldswick U.D. No. 1. Belper R.D. No. 2. Castle Ward R.D. No. 1. Cheltenham B. No. 7. King's Lynn B. Reffley. Ripley U.D. No. 2. Skipton U.D. No. 6. Southampton C.B. No. 8.

**SCOTLAND**

**NEW SMOKE CONTROL ORDERS  
IN OPERATION**

Alloa No. 1. Coatbridge (Greenend). Falkirk No. 8.

**NEW SMOKE CONTROL ORDERS  
CONFIRMED BUT NOT YET IN  
OPERATION**

Dumbarton Burgh No. 9. Stirling County (Bonnybridge No. 1).

**NEW SMOKE CONTROL ORDER  
SUBMITTED BUT NOT YET  
CONFIRMED**

Bishopbriggs No. 2 (Cleddens).

**NORTHERN IRELAND**

**NEW SMOKE CONTROL ORDERS  
CONFIRMED BUT NOT YET IN  
OPERATION**

Downpatrick U.D. No. 1. Holywood U.D. No. 3. Newtonabbey U.D. No. 3. Portadown Boro. Nos. 3 and 4.

**NEW SMOKE CONTROL ORDERS  
SUBMITTED BUT NOT YET  
CONFIRMED**

Hillsborough R.D. No. 2. Lurgan Boro. No. 2.



# **Addition to the Clean Air Year Book 1969-70—Research by Central Electricity Generating Board**

Information regarding current research in air pollution by the C.E.G.B. is given on pages 24-26 of the Clean Air Year Book for 1969-70. Just after the Year Book had gone to press we received further information from the Board regarding research into Dust Measurement. This, unfortunately, could not be included in the Year Book, but it is printed in full below, and members may care to cut it out and insert it in their copies of the Year Book.

## **Dust Measurement**

Because it was thought that the standard deposit gauge had a limited application to modern dust problems, a new type of gauge has been developed for measuring dust in the field known as the C.E.R.L. Directional Dust Gauge. This has been used in routine measurements around a number of modern power stations and its directional characteristics are considered to be of considerable assistance in the interpretation of measured results. Its design is about to be modified to make it as cheap to produce as possible, and will shortly be incorporated in a British Standard Specification.

While measurement in the field is important in the study of air pollution there can be little doubt that in the achievement of clean air it is vital to have adequate measurement and control at the source of emission. The pollution by dust at ground level is caused in the main by particles in the range from  $20\mu\text{m}$  upwards, and an instrument has therefore been developed known as the C.E.R.L. Dust Monitor which gives a continuous record of the emission of these coarser particles which are not recorded by instruments used to measure the emission of smoke. The C.E.R.L. Dust Monitor has recently been redesigned to give it the maximum reliability under power station conditions and the commercial production of this Mark II design is now being pursued. Readings which correspond to the standards of emission laid down by the Chief Alkali Inspector have been provisionally agreed. Operational Instructions are being prepared for the systematic use of these instruments in stations.

In order to facilitate the consideration of the recorded readings, instruments are being developed which will give an eight-hour print-out for the sum of the readings of all the instruments in a given power station. This will greatly facilitate managerial control.

It is nevertheless also important to monitor the emission of fine particles which are less than  $20\mu\text{m}$  in diameter, and while optical density type instruments have existed for many years for this purpose they have not in general been satisfactory. A number of new instruments which are sensitive to fine particles and therefore to emissions which affect the clarity of the atmosphere have been developed inside the Generating Board. A smoke density instrument which can be inserted from one side of the duct and removed for a manual check of zero has been developed by S.E. Region. An instrument which measures the light reflected from the dust in the duct has been developed by N.W. Region. An instrument has been developed at C.E.R.L. which not only has specially designed windows to minimize the problem of the obscuration of windows but also gives a frequent and automatic record of the instrument zero.

# WINSTON CHURCHILL MEMORIAL TRUST

The Trust was established in 1965 as a unique form of National Memorial to Sir Winston Churchill.

It enables men and women, who might never otherwise have the chance, to travel abroad, widen their knowledge of their own field of activity, learn how people live and work in the different parts of the world. As a result of the experience they gain, they contribute much more to their profession, community and country.

Every year the Council chooses a number of categories which reflect a broad cross-section of life in the country: the arts, social and public service, industry, nature, sport and adventure. Within these categories, men and women of all ages, who are citizens of the United Kingdom, are eligible. Academic or professional qualifications are not needed, but candidates must be able to convince the selection panel that they have the knowledge and initiative to make full use of a Fellowship, both while they are abroad and when they come back.

So far, 292 Churchill Fellows have been selected in 51 different categories. They have travelled to most parts of the world. The average grant of about £1,500 covers all expenses for about three months.

The Trust funds, which were raised by public subscription under the Chairmanship of the late Field Marshal Lord Alexander of Tunis, provide an annual income of about £155,000 of which 14 per cent is spent on administration, 5 per cent on advertising and 81 per cent on the Fellowships.

The following categories for awards in 1970 will be of interest:

## *POLLUTION OF THE ENVIRONMENT*

Our future well-being may be jeopardized by noise, chemical waste and effluents, the side effects of insecticides and chemicals. What can be done about it?

## *COLLECTION AND DISPOSAL OF REFUSE*

Every day we throw away a great deal of so-called 'rubbish' that could be usefully reclaimed. We also disfigure both out town and countryside with unsightly and sometimes dangerous litter. How can this be avoided?

To obtain an application form, send your name and address **only** on a post-card to: Winston Churchill Memorial Trust, 10 Queen Street, Mayfair, London W1X 7PD.

Completed application forms must be returned before **15th November 1969.**



# Air Pollution Abstracts

**1132. Air Pollution by Motor Vehicle Exhaust Fumes.** (In French) Chapoux, E. (Technical Aspects of Road Safety, 1969, 37, No. 3, 2-50). The elements of the problem of air pollution by motor vehicle exhaust gases are briefly recalled and also the means of fighting this scourge.

In order to simulate urban traffic conditions, research has been undertaken to define a standard cycle. Measuring and resulting figures have led to the conception of the U.T.A.C. sequential course as a basis for measurements and have contributed to the definition of a cycle which is now accepted for Europe.

The study of CO and hydrocarbon emissions makes quantitative comparisons possible between European and American procedures.

Different solutions are proffered for complying with the new regulations.

**1133. Clean Air Maintenance in the non-ferrous Metal Industry. Part 3.** (In German) Knop, W. February 1969, 23, No. 2, 183-189) (Zinc Dev. Assn.) The characteristics, operation and applications are described of devices used for the removal of dust from exhaust gases and fumes in the nonferrous industry. Both dry and wet methods of precipitation are discussed. Dry systems include mechanical collectors, electrical precipitators and fabric filters. References are made to the use of the devices in zinc and lead foundries and hot dip galvanizing plants.

**1134. Accomplishment of Tasks in the Protection of the Atmosphere.** (In Polish) Janiszewski, W. (Ochrona Powietrza, 1969, 3, No. 2, 1-7). The article discusses the reasons for the increase of atmospheric pollution in Poland, characteristics of pollution sources, trends in research, the growth in production of dust removing installations as well as results achieved so far and further activities planned in the field of protection from atmospheric pollution.

**1135. Significance of Sulphur Studies on Environmental Health.** Davis, K. (Proc. Amer. Pet. Inst. Div. of Ref. 1968, 48, 591-610). (J. of Fuel & Heat Tech., London). The effect of sulphur compounds in the atmosphere on the health of society has been a subject which has received extensive study during the past several years by the medical profession. According to the literature in 1880 the sulphur dioxide content of the air in London was responsible for some 1,000 deaths. Similar references have been made to the effect of increased sulphur dioxide content on mortality on at least nine other occasions when inversions occurred over such cities as London, Meuse Valley, Donora, and New York City. The most recent incidents that have caused concern occurred during the 1966 Thanksgiving holiday on the American east coast, with New York and Philadelphia reporting sulphur dioxide values as high as 1.0 ppm.

**1136. The Control of Atmospheric Pollution from Gas Turbine.** Durrant, T. (Air World, Nov./Dec. 1968, 21, No. 3, 65-70). The main forms of atmospheric pollution by gas-turbine exhaust are smoke and oxides of nitrogen at top speed and unburned fuel and carbon monoxide at engine idle conditions. Smoke trails constitute a visual nuisance and the other contaminants are either toxic or irritant or both.

Combustor design with improvements in fuel/air mixing and the use of air-assisted sprayers will reduce smoke to barely visible levels on future engines. In addition, the latest annular chambers will give reduced concentrations of unburned fuel and carbon monoxide.

Oxides of nitrogen will be difficult to reduce but current concentrations are less than measured on the automobile.

**1137. Smoke Reduction in Jet Engines Through Burner Design.** Faitani, J. J. (Air World, Sept./Oct. 1968, 21, No. 2,

34-41). Results of experimental testing show that smoke can be significantly reduced by increasing the amount of air admitted to the primary zone. However, the location of the air entry ports, manner of air injection and fuel spray quality are critical factors. Significant changes in combustor stability, ignition, carbon deposition and durability characteristics are affected by the alteration of the primary zone fuel and airflow pattern.

Extensive work has also been required to develop smoke-measuring systems. A modified Von Brand Filtering Recorder has been selected as the standard measuring system.

**1138. Sulphur Oxide Emissions Acid, Smuts and Low Temperature Corrosions.** Strauss, W. (Industrial & Proc. Heating, July 1969, 4-7). The related problems of sulphur oxide emissions and their control, the formulation of acid smuts, and low temperature corrosion of chimneys has been investigated by the author in conjunction with two research students over the last five years.

**1139. Harmful Exhaust Emissions of a Modern Two-Stroke Engine.** Prietsch, W. and Muller, F. (K.F.Z., Dec. 1967, No. 12, 355-356) (M.I.R.A., Transl. No. 33/68, 9 pp.). (W.S.L.). Most investigations on noxious motor-vehicle exhaust gases have been made on four-stroke engines. Tests made on a modified Wartburg, three-cylinder, two-stroke engine are reported. The carburettor setting used led to good fuel economy. Measurement showed under 1 per cent exhaust CO by volume up to full-load and values at full-load similar to those for four-stroke engines; in general, concentrations of oxides of nitrogen were lower for the two-stroke engine.

It is concluded that, given correct design, tuning of the engines and a satisfactory level of exhaust hydrocarbons, the two-stroke system can be advantageous in both spark-ignition and diesel engines.

**1140. Effects of Atmospheric Contamination of Cancer Mortality in Petroleum Refinery Employees.** Baird, V. C. (J. Occup. Med. 9, No. 8, Aug. 1967, 415-423). (W.S.L.). The refinery has been making air pollution evaluations for more than 35 years and has established a base-line survey of refinery losses to the atmosphere. Comprehensive surveys from 1950-52 to date have shown the most

significant releases to be hydrocarbons, sulphur dioxide, hydrogen sulphide, mercaptans, fumes and particulates. Over the years, a substantial reduction has been made in emission and a table shows the steps taken, the method and the per cent reduction for SO<sub>2</sub> in the period 1953-63. Mortality rates from lung cancer for a 29-year period (1935-63) for 15,437 employees have been reviewed. Employees of the refining group were compared with the producing, transportation, sales, and exploration groups. Comparisons were also made with the general (adult) population of the same geographical area. There was no greater incidence of deaths from lung cancer in the group of refinery employees than there was in other employees with less exposure to air pollution or among the population of the area.

**1141. Studies on the Effects of Prolonged Exposure of Rabbits and Rats to very weak levels of Carbon Monoxide, III.** (In French) Truhaut, R. et al. (Arch. Maladies Profess. Med. Travail Sécurité Sociale (Paris) April-May 1968, 29, 189-196). (W.S.L.). Seven rabbits exposed to 100 ppm CO for 2,500 hours exhibited higher arterial pressure than controls (9.2 mm. compared with 6.7 mm.). These rabbits also exhibited a slight decrease in cardiac rhythm, which is more pronounced when electro-cardiograms are normal, although there is some indication of increased ventricular depolarization. Upon autopsy, hearts of the exposed rabbits weighed 1/335th of the total body weight, compared with 1/360th in controls. Similar studies of heart weights in rats are discussed. They also reveal a possibly significant cardiac hypertrophy. No anatomical or histological anomalies of the heart are noted. It is concluded that 100 ppm CO has a definite effect, especially on young animals.

**1142. Experimental Exposure of Human Subjects to Ozone.** Goldsmith, J. R. and Nadel, J. A. (J. of Air Poll. Contr. Ass. 19, No. 5, May 1969, 329-330). Four presumably healthy male subjects were exposed for one hour to ozone at 0.1, 0.4, 0.6 and 1.0 ppm. Airway resistance increased slightly but significantly after exposure in two subjects at the lowest concentration, in one each at the two intermediate concentrations, and in all four at 1.0 ppm. The increases were physiologically small and generally less than those in normal subjects inhaling the smoke from a single cigarette.



**1143. Air Quality Standards for Fluoride Vegetation Effects.** Hill, A. C. (J. of Air Poll. Contr. Ass. **19**, No. 5, May 1969, 331–336). Facts that must be taken into consideration in developing fluoride standards for vegetation effects include: (1) Fluoride is an accumulative toxicant and injury is usually associated with long-term exposure; (2) gaseous and particulate fluorides differ in their phytotoxicity; (3) plant species and varieties differ greatly in susceptibility to fluoride; (4) extremely low concentrations can cause damage to sensitive species. Three possible approaches to standards are discussed: Atmospheric fluoride concentrations, vegetation fluoride concentration, and the presence of leaf necrosis. Atmospheric fluoride concentration has the advantage that it fits the conventional concept of standards and that it is objective. Accurately measuring low fluoride concentrations, separating gaseous from particulate fluorides in the air sample, and establishing a safe concentration present technical problems, however. Vegetation analysis may more closely represent fluorides available to affect the plant. The presence of significant amounts of fluoride-induced leaf necrosis (e.g. 3 per cent of the leaf area) may be the most practical approach to standards for fluoride vegetation effects. Advantages are that the combined effects of the forms of fluoride, species and varieties, and concentration-time relationships are all manifest in the factor that is measured. Relatively little time is required to examine the vegetation in a large area and only two or three surveys a year are required.

**1144. California Vehicle Exhaust Control. Past and Future.** Brubacher, M. L. (J. of Air Poll. Contr. Ass. **19**, No. 4, April 1969, 224–249). California's experience with vehicle exhaust controls for three model years is related, and future possibilities for improving the continued effectiveness of these controls are discussed. Tests of exhaust controls on 1966 and subsequent model cars in public use indicate a reduction in hydrocarbons of about

60 per cent for the vehicle life of 100,000 miles compared to uncontrolled cars. However, emission levels and emission deterioration rates in public use are higher than those reported from proving ground tests. Significant percentages of new cars are delivered from the factory maladjusted which has a significant effect on emissions. These maladjustments are worsened by automotive service personnel.

**1145. Engine Modifications for Improving the Exhaust Gas Composition.** (In German) Muller, H. (Staub, **29**, No. 6, June 1969, 219–226). The energy conversion of the fuel-air mixture is considered to show the possibility of influencing the exhaust gas composition. The composition of exhaust gas from an actual engine is compared with that from an engine with uniform mixing conditions. In the case of the *Otto* engine the effect of the wide boiling range of fuel has a considerable influence, and consequently the distribution of fuel to the individual cylinders is non-uniform in the case of a multi-cylinder engine. Investigations into the cyclic variations in pressure development indicate that mixing in the combustion chamber of the *Otto* engine is inhomogeneous. The intended layer charging does not improve the exhaust gas composition for the *Otto* engine.

**1146. The Medical and Biological Significance of Motor Car Exhaust Gases.** (In German) Stresemann, E. (Staub, **29**, No. 6, June 1969, 227–231). Motor car exhaust gases affect more and more the hygienic conditions in Europe. The acute and chronic biological effects of these emissions are discussed on the basis of investigations carried out in laboratory or by medical and epidemiological methods. The effects of the individual components of motor-car exhaust gases are presented, and the basically different nature of acute and chronic effects is discussed in detail. Conclusions with respect to preventive hygiene follow from the final consideration.

# INDUSTRIAL and COMMERCIAL NEWS

## EQUIPMENT AND SERVICES

### Smoke Monitor

A smoke-density monitor designed to meet industrial requirements under the Clean Air Act is being marketed by Hird-Brown Ltd.

The equipment comprises a control unit, a light-beam projector unit with low voltage transformer, a photocell, receiver unit, alarm bells, indicating meters, a voltage stabilizer and roll-chart recorder.

When used as an alarm to comply with the Act, the equipment is so set up that a relay operates immediately smoke exceeds a preset density. This relay operates again within one per cent of the set point when smoke density decreases.

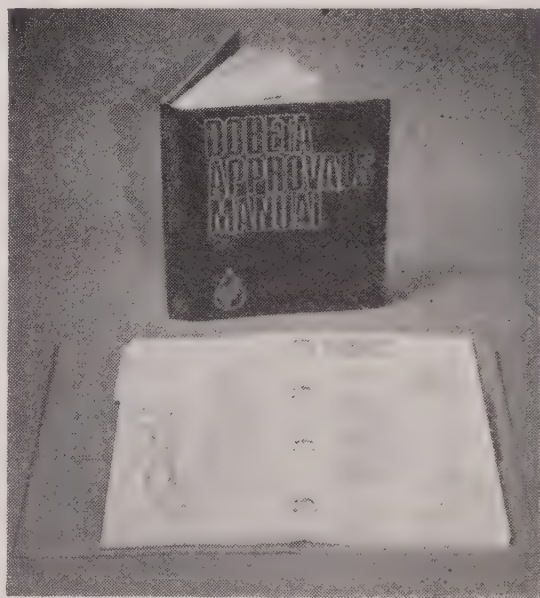
### Standard Product Removes Dangerous Gases from Production Areas

The wide range of industrial needs for on-the-spot removal by suction or blowing, of air polluted by dangerous gases is fulfilled with a standard product and its accessories.

New "Super COBRA" fans and accessories now provide an economic and original solution to the safe removal of gas pollutions from production areas. Whether it is from the inspection pits in a commercial garage or from the largest super size oil tankers, the fast removal of fumes or gases is accomplished effectively and efficiently with this handy portable fan capable of moving 500 cubic feet of polluted air per minute.

### DOBETA—Approvals Manual

DOBETA announced the publication of the letterpress edition of their approvals manual. This edition supersedes the temporary typescript edition issued when the Association commenced testing in 1968.



The Dobeta Approvals Manual

### B.S.I.'s Certification Scheme for Diesel Road Vehicles

The British Standards Institution, with the support of the Society of Motor Manufacturers and Traders will provide an independent authentication of the compliance of diesel engine performance with the requirements of B.S.A.U. 141 "the performance of diesel engines for road vehicles". This scheme is for type approval of different designs of diesel engines and is not one of continued surveillance and sample testing.



### **Car Burning Furnace**

Burning is one of the cheapest and most effective systems for removing cellulose and unwanted combustion materials from disused motor vehicles. It is not, however, an easily managed procedure and open burning produces the large quantities of heavy black smoke which has led to the banning of this method by many local authorities. On the other hand, many car breakers and scrap metal dealers find the economy of burning and baling themselves by far outweighs the cost and time involved in sending cars to fragmenters. H.B. Reclamation Ltd. has taken a realistic approach to this problem, and its engineers have applied many years of experience of furnace design to producing the "Auto-Burn", a furnace, which they claim is rapid and effective and which incorporates a smoke-consumer.

### **Oil Conversion Chimney Liners**

A new leaflet issued by W. E. Rodell & Son Ltd., Leighton Buzzard, Beds., describes their service for the manufacture and installation of insulated chimney liners. When steam boilers are converted to oil firing, insulated liners prevent the emission of smuts by maintaining flue gas temperature above 300°F dew point.

### **New Gas-Air Sampling Equipment Available in U.K.**

Research Appliances range of gas and air sampling instruments for air pollution studies are designed to produce tapes indicating particulate or hydrogen sulphide concentrations. Two versions are now available in the U.K., one of which has built-in evaluators and recorders and the other, a more simple unit from which the tapes must be evaluated in the laboratory. A series of portable units for air pollution analysis is also now available.

### **New Incinerator Range**

A brochure describing the new continuous duty range of packaged incinerators from 25 to 100 lbs. per hour capacity is now available from Bower and Kay Ltd. These are suitable for most industrial, commercial and institutional purposes.



The Bower & Kay incinerator



## **“Breathalyzer” Tests for Cars as well as Drivers**

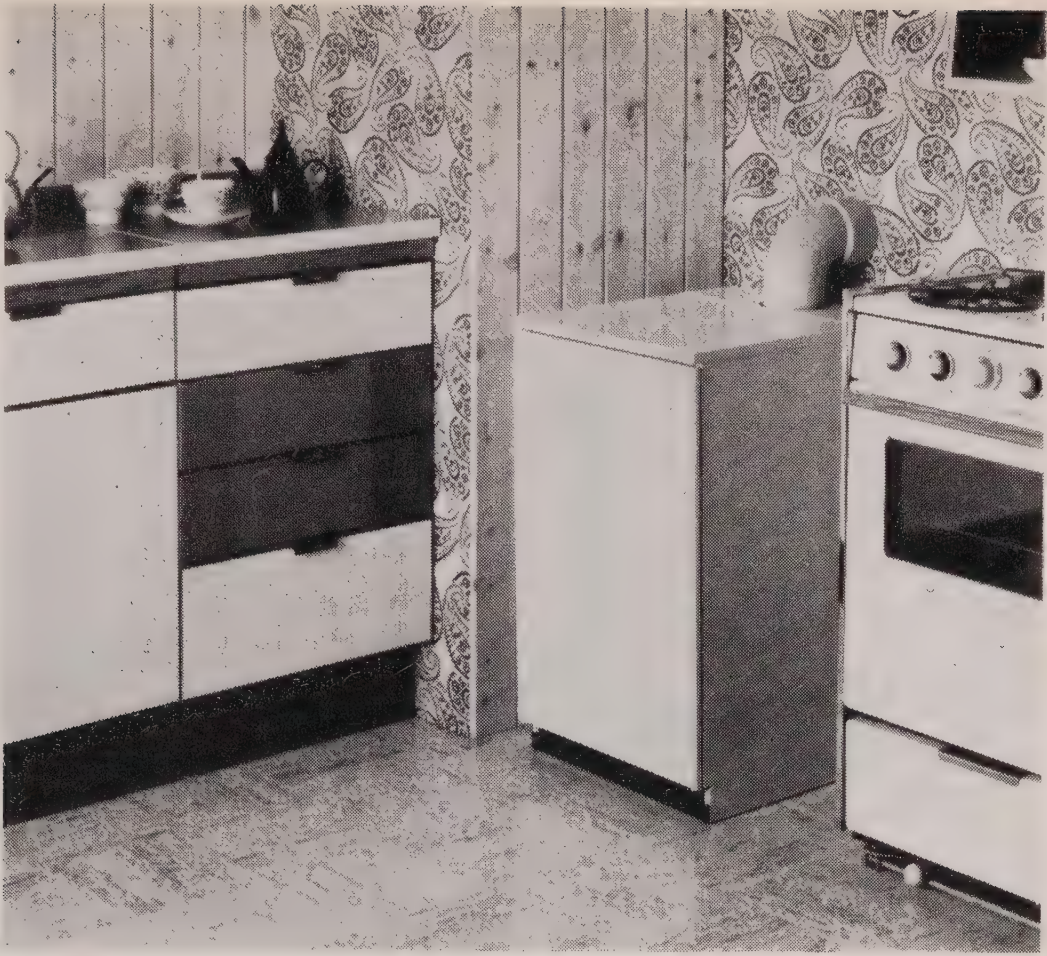
Roadside “breathalyzer” tests for cars as well as their drivers may soon be the pattern on British roads.

A Poole, Dorset, firm has developed a portable, easy to read and easy to operate instrument with which an unskilled operator can test vehicle exhaust in a matter of seconds to see if the poisonous carbon monoxide content is “over the limit”. It has been

designed for the day when spot checks of exhaust gases become as much a part of the law on British roads as breathalyzer tests are today, and when checking for carbon monoxide output is included in normal M.O.T. tests and servicing procedures. The “COSIGN”, as it is called, can be used on all vehicles with petrol-driven engines, but it is not applicable to diesel engines.







The Stelrad gas-boiler

### **Centrifugal Cyclone, Fabric Dust Collector Combined by Torit to Boost Dust Control Efficiency**

An air pollution control system which combines a centrifugal separator and a cloth filter dust collector represents the latest effort by TORIT to present airborne pollutants from industrial processes from entering the atmosphere.

Proved effective in collecting dust and smoke from such critical operations as tyre re-treading, this unique combination of centrifugal and fabric dust control equipment can be made even more efficient by adding a secondary series of "absolute" after-filters.

This system of dust control, according to Torit, represents the most efficient means known to mankind for filtering particulates from industrial processes or processed air or gas streams.

### **Stelrad 35,000 BTU/HR Multi-Gas Boiler**

Steel Radiators Ltd., manufacturers of Stelrad Central Heating Equipment have now introduced a fully automatic multi-gas boiler to provide full central heating and hot water for the smaller home.

### **Electric Vans for G.P.O.**

Later this year, battery electric mail vans will be introduced experimentally by the G.P.O. It is expected that the first of the ten vehicles ordered should be on the road within a few months. With a top speed of around 20 m.p.h., each van will carry about 30 cwt. of mail. While at first these vehicles will carry mainly parcels, they may be put to other uses later, and a prototype has been on trial at Leicester for more than a year. The vans will be apportioned to regions throughout the United Kingdom.



## New Static Pressure Sensor Developed

A new static sensor which automatically aligns with duct airflow direction to give accurate static pressure signals under field conditions, is announced by Perfection Parts Ltd., of London S.E.1.

Designed for use in air conditioning and heating ducts, air filtration, ventilating, fume exhaust and special atmosphere systems, it provides a solution to a familiar problem.



## Giant Plastic Fan Combats Air Pollution

What may be the world's largest plastic centrifugal fan, rated at 104,000 c.f.m. has been completed by the Plastic Blower Company, a subsidiary of The Ceilcote Co. U.S.A., for use in air pollution control system exhausting 4 per cent sulphuric concentrations at a temperature of 160°F.

It has now been announced that this parent company has formed a subsidiary in Great Britain, to serve the U.K., Eire, Scandinavian and South African markets, producing corrosion resistant materials and equipment including pipe ducts, tanks and scrubbers.

## Cost Break-through in District Heating

A new type of reinforced plastic pipe has given a tremendous boost to the whole concept of district central heating.

Developed by B.P. Plastics and Redland Pipe Ltd., the new pipe was recently laid for service trials at a new housing estate near Bridgend, South Wales. The pipe is of sandwich or "pipe-in-pipe" construction, the two walls of glass fibre—reinforced CELLOBOND polyester resin—being separated by a thick layer of insulating material. The system has important advantages over conventional steel mains.



## PEOPLE IN THE NEWS

Allied Ironfounders Ltd. have appointed Mr. W. H. Morris to the newly created post of Group Publicity Manager to coordinate the company's activities in the fields of advertising, press and public relations, technical and product promotions and exhibitions. Mr. Morris who is 33, was previously with G.K.N. Engineering Ltd. as Publicity Manager.

### Awards to B.C.U.R.A. Directors

The Council of the Institute of Fuel announces that the Thring Award is to be made to Mr. H. R. Hoy, a Director of B.C.U.R.A. Industrial Laboratories in recognition of his work in high temperature slagging in combustion appliances. This Award is made for work which constitutes a definite step forward in fuel technology, preferably based on fundamental principles. This is only the second time that the award, made at intervals of about five years, has been conferred.

At a degree ceremony held on 10 July at the University of Bristol the degree of Ph.D. was conferred on Mr. G. G. Thurlow, one of the Directors of B.C.U.R.A. Industrial Laboratories.

**Mr. P. F. Dilnot, C.Eng., F.I.Mech.E., M.I.Mar.E.,** has been appointed to the Board of Houseman and Thompson Ltd., the water treatment and chemical cleaning specialists of Burnham, Bucks.

### Redfyre Appoints Marketing Manager

Redfyre Ltd.—part of the Newton Chambers Group of Companies—has appointed Mr. Ian M. Meggitt, Marketing Manager.

Mr. Meggitt joins the Thorncliffe, near Sheffield firm from International Janitor where he held a similar post.

### National Coal Board—Regional Chairmen—Mr. W. L. Miron to take over South Wales

Upon the retirement at the end of August of Mr. A. H. Kellett, Regional Chairman, N.C.B. South Wales, after 45 years' service to the coal industry, Mr. W. L. Miron, Regional Chairman, N.C.B. Midlands will take over the duties as Regional Chairman, in South Wales in addition to his present responsibilities.

### New President for Joy International

John E. Bishop, Managing Director of Joy Manufacturing (U.K.) Ltd., the British subsidiary of Joy Manufacturing of Pittsburgh, has been appointed President of Joy International S.A. with headquarters in Brussels. He is the first Englishman to be appointed to the position and now has overall control of Joy marketing activities in the eastern hemisphere. As a result of his dual role, Mr. Bishop will also assume responsibility for other Joy operations in the United Kingdom including Western Precipitation Division, of London W.1, dust and fume collection equipment manufacturers.

### Retirement of Doctor W. Reed, C.B.E.

Dr. W. Reed, C.B.E., who has been the National Coal Board Regional Chairman with special concern for the Northumberland, North Durham and South Durham areas since the reorganization in 1967, retired from the Board on 2 July, 1969.

### New Director for Fulner Research Institute

On 1 June Dr. W. E. Duckworth took up his appointment as Director of Research, Fulner Research Institute. He succeeded Mr. E. A. G. Lidiard the first Director, who will remain on the Board as a consultant to the Institute.

## COMPANY BRIEFS

### **Breakthrough into North American Market—Clean Air Export success to Canada**

An export breakthrough of particular significance has been gained by A. & M. Fell, Newhaven. Against fierce American competition they have won an order for four 12-foot-long, double-sided, laminar flow work stations from BROCAIR SYSTEMS LTD., CANADA, for their facility at Brockville, Ontario.

FELLS regard it a notable achievement to have broken into the U.S. dominated clean air market, and to have beaten the competition on both quality and price in their own territory, even taking into account the cost of shipping these items across the Atlantic.

### **N.C.B. Agreement with National Air Pollution Control Administration**

In June this year Lord Robens, Chairman of the National Coal Board, signed an agreement in Washington with the National Air Pollution Control Administration covering the technical aspects of fluidized combustion. Lord Robens said "as a result of this agreement we now have the full backing of the most technologically advanced nation in the world for our work on fluidized combustion".

### **National Heating Centre**

The Board of Trade have recently given approval for the Centre to change its name to—National Heating Centre. The new name is more indicative and descriptive of the Centre's activities and immediately identifies the National Heating Centre from the many shops and showrooms using the title of "Heating Centre".

### **£300,000 Precipitator Order for Lodge-Cottrell**

Lodge-Cottrell Ltd., Birmingham have received an order valued at approximately £300,000 for the supply of electrostatic precipitators for the boiler plant to be installed by Clarke Chapman Ltd., at Alcan Aluminium Smelter Plant, in Lynemouth.

Lodge-Cottrell is a Simon Engineering Co.

### **Todd Combustion Ltd.**

Combustion Equipment Associates Incorporated, a public company resident in the United States of America, has acquired the whole of the Combustion Division of Todd Shipyards Corporation of America, including a majority holding of Todd Combustion Ltd. of Swanley, Kent. The new parent company is rapidly expanding in air pollution prevention, oil and gas burning and control fields. This expansion will materially benefit the development of Todd Combustions Ltd.

### **Bekon-Bell on the Move**

Bekon-Bell, central heating manufacturers, have moved to larger premises in Slough, Bucks, to accommodate their expanding business and increased staff.

### **"Airflow" Appoint Distributor for Flue Dilution Units**

In order to provide installers of heating equipment with an even better service when they require Airflow Flue Dilution Units, Airflow Developments Ltd., High Wycombe have appointed Granville Controls Ltd. as distributors of their extremely quiet and compact fan for handling combustion products from gas burning appliances. Granville Controls have branches in London, Manchester and Yeovil.



### **Extensions to Smokeless Fuel Plant**

The National Coal Board are spending £4 million on their Phurnacite Smokeless Fuel Plant near Aberdare. The extensions which are due to come into production at the end of 1970 will increase the plant's capacity to one million tons a year.

Mr. W. B. Cleaver, General Manager of Coal Products, South Western Region, said: "We aim to increase Phurnacite production without increasing atmospheric pollution. There is a very big demand for the fuel now that more and more smoke controlled zones are being extended all over the country."

### **800 Convactor Heaters**

An order for approximately 800 radiant convactor heaters has been secured by the Beeston Boiler Co. from G.N. Haden & Sons Ltd., of Torquay.

### **"The Devil of a Story" or "My Tiny Hand Was Frozen"**

This is the title of a new film made for Radiation Parkray Ltd., manufacturers of Parkray solid fuel room heaters, which "stars" the latest extra high output Parkray 99X Room Heater which provides central heating and hot water. This film will be available on loan from Radiation Parkray Ltd. from the end of July and shows Patricia Driscoll as "Mrs. Winter", a chilly housewife, and Michael Gover as the "devil" who tempts Mrs. Winter with warmth.

### **York Contract for University of Libya**

An export order value £175,000 has been gained by the York Division of Borg-Warner Ltd. to supply water chilling equipment for air conditioning for the new university of Libya now being built in Benghazi.

### **Successful Canadian Tour for G.W.B. Marketing Director**

Mr. R. D. Northcote, Marketing Director, for G.W.B. Boilers Ltd. of Dudley has returned after a successful sales tour of Canada during which orders totalling over 25,000 dollars were placed during his four-day Canadian visit. Extreme interest was shown for the Company's automatic coal/woodwaste firing boiler. Mr. Northcote stated that the woodwaste plant to be supplied will be in operation during the autumn of this year and that further plants of a similar nature are expected to be ordered in the near future.

### **Move for S.F. Air Treatment**

S.F. Air Treatment Ltd. have moved to new offices at Staines, Middlesex. This move is in line with the company's expansion policy and follows its recent rapid development.

### **Selkirk-Metalbestos Ltd. of Brockville, Ontario, Canada.**

This firm, who claim to be the world's largest manufacturers of factory-built chimneys, have announced plans to set up a factory in the United Kingdom to supply both the British and European markets. Work has already begun on the first phase of the plan on an eight-acre site at Barnstaple in North Devon, involving some 20,000 sq. ft.; future plans will bring the total factory area to 168,000 sq. ft.

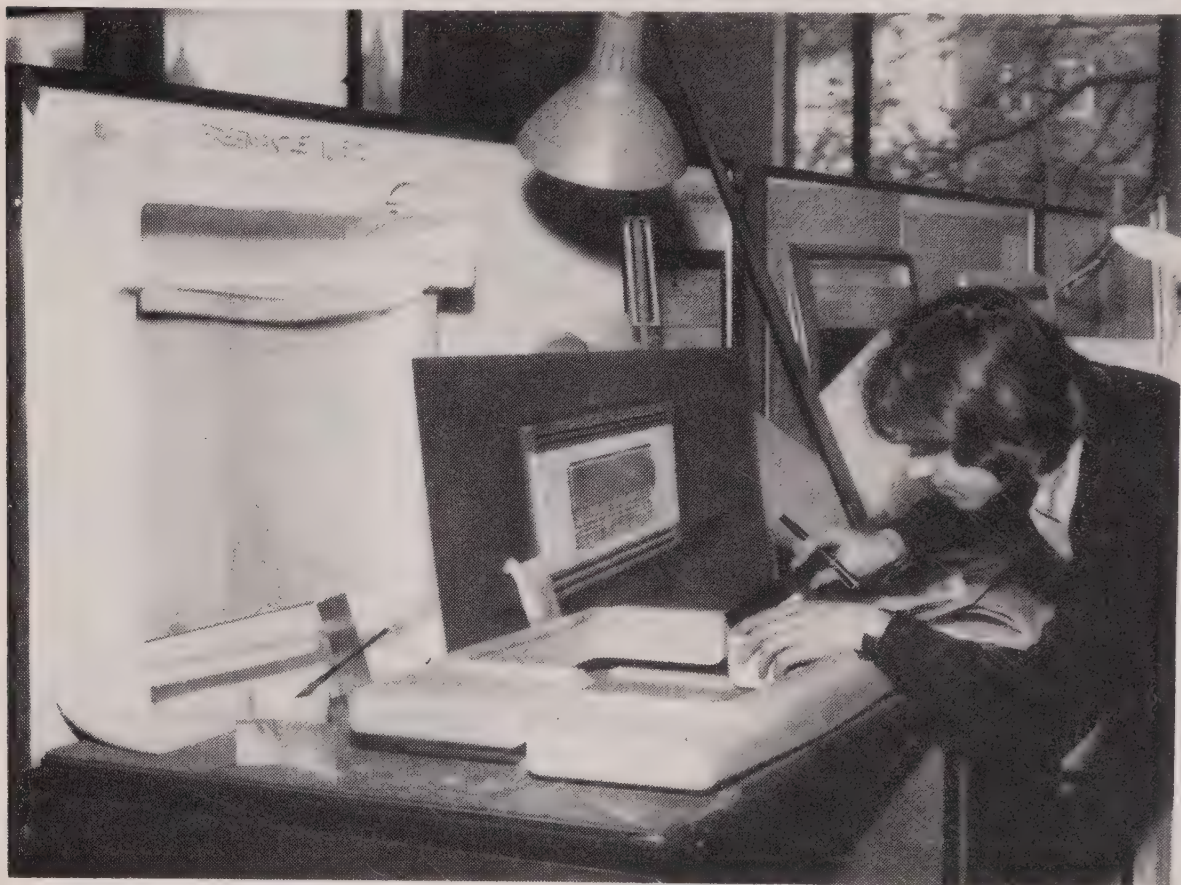
### **First Agent for McFarlane-Walls Ltd.**

McFarlane-Walls Ltd., Kingston-upon-Thames, installers of Supafllu linings, have appointed D. & D. (South Wales) Ltd. of Newport as the sole installers for the County of Monmouthshire. This is the first firm to be awarded the Supafllu franchise.

### Fire of the Future

The gas fire of the future, how will it look? We may soon know, for ten students in the first year course of industrial design at the Royal College of Arts are designing fires with the backing and guidance of Radiation Gas Fires Limited. As a current pro-

ject, the students have been given the choice of designing either a living-room fire or one for a secondary room such as a bedroom. The models will be judged by a panel of experts when completed and prizes up to £100 will be awarded by Radiation Gas Fires Limited.



24-year-old Jim Wilkinson at work on his model of a living-room fire

### Export Success for North Thames Gas

A new type of aluminium melting furnace has been ordered from North Thames Gas by the Allen Stevens Corporation of the United States, who will use it for melting aluminium billets at a rate of 350 lbs. per hour. North Thames regard this American order, the first they have ever received for metal melting equipment from the States, as evidence of their successful development work in the field of non-ferrous metal melting.

### £20,000 Order for British Lidar System for German Air Pollution Study

A model 402 optical radar system from Laser Associates of Slough, Bucks. has been sold to the West German Ministry of Labour for use by Institute fur Emission Schutz in studies of air pollution in the heavily industrialized area adjoining Essen. Described as the most sophisticated Laser range finder yet built in Europe, it will be located on top of a tall building, from which the Laser will be fired at smoke emitted from factory chimneys.



# Information available for clean air campaigns



## EXHIBITION

A complete pre-fabricated and self-contained "Clean Air" Exhibition: adaptable in size with one, two, three or four approved smokeless appliances under fire, and displays of the smokeless fuels available in the district

## MOBILE UNITS

Manned with technical demonstrators, to advise and help residents in proposed or newly-formed Smoke Control Areas. They incorporate approved appliances under fire and a display of the solid smokeless fuels

## DISPLAYS

A range of portable units variously displaying instructional panels dealing with Clean Air and the Act, a typical central heating unit, fuel displays and literature displays

## LITERATURE

Informative literature is available free to Local Authorities explaining the Clean Air Act, and giving full information on solid smokeless fuels and the appliances

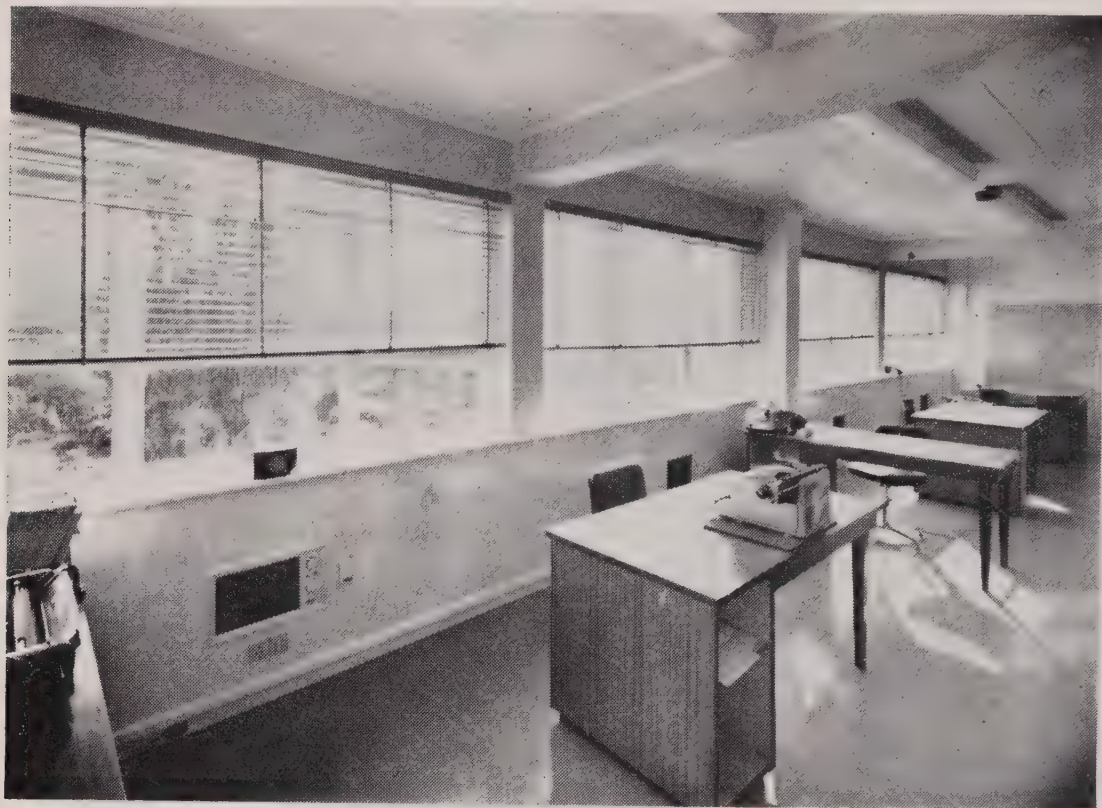
The comprehensive services offered free by the Solid Smokeless Fuels Federation can make an invaluable contribution to "Clean Air" campaigns, the implementation of Smoke Control Areas, and the organization of House Improvement or Conversion schemes. Local Authorities who are interested in utilizing the aids shown above are invited to apply to:

**SOLID SMOKELESS FUELS FEDERATION**

York House, Empire Way, Wembley, Middlesex

S57

# HEATERS for the 70's for the MODERN HOME or OFFICE



from **sager**

*Illustrations showing the MH 4  
in an office and in the home*

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Cleanline the modern range of bathroom, hall, and bedroom heaters.

PRICE RANGE FROM  
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*For further information contact: W. G. Foot, Sales Manager*

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Trade Refuse, Industrial Refuse  
Chemical Wastes, Old Cars, Old Furniture  
Scrap Cable, Municipal Refuse

## **FUME DESTRUCTORS**

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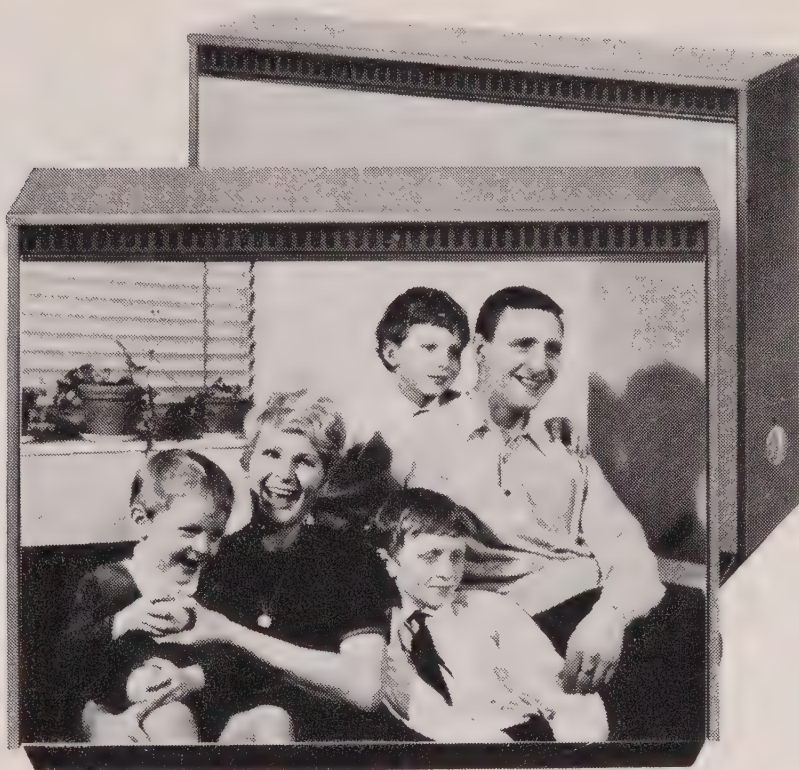
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## **Electric Central Heating**

Automatic, simpler and cheaper to install than other systems. Runs on special low rates, and, of course, complies with the Clean Air Act.

**Storage Radiators** The most easily installed and practical system for existing property. Wide variety to choose from, including fan assisted models for greater flexibility and control.

**Electricaire** Warm Air Central Heating by Electricity. Essentially a centrally sited storage heater with

warm air through ducts—controllable room by room. Ideal for new property.

**Water Heating** By Electricity, immersion heaters or self-contained heaters—a wide range for home, office or factory. Negligible maintenance, easily installed and economical in use.

**Air Conditioning** Gives maximum effect to controlling environmental conditions in offices, shops, hotels and public buildings.

**Better things are electric**

*Issued by the Electricity Council, England and Wales*

# ***Buellability:***

***What is it?  
What does it offer?***

Buellability produces more efficient plant with operational savings for your dust collection and powder classifying. In these fields Buell specialise in designing, supplying, erecting and commissioning plant to suit individual requirements. Testing station and laboratory facilities are available. Do you need Buellability?

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Dust Control and Air Cleaning Exhibition,  
Olympia, 23rd—26th September 1969



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BAG COVER

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ACCESS DOOR

SCREW CONVEYOR

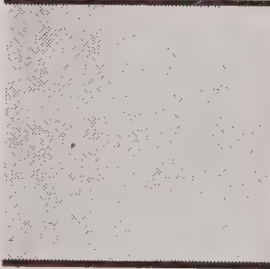


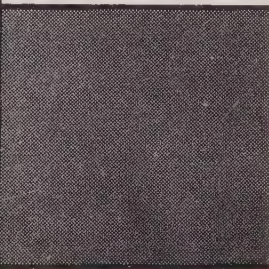
ROTARY VALVE

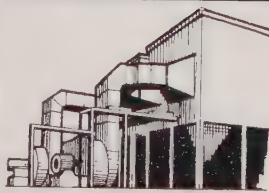
# HOW BIG IS YOUR DUST PROBLEM?

A recent addition to the Holmes range of bag filters is the fully automatic Vibro Chamber Filter. An important design feature is the method of compartment isolation and bag vibration — the vibrating mechanism is designed to give maximum vibration at the top of the filter bags where the fine dust particles, normally difficult to dislodge, are collected. A collection efficiency in excess of 99% can be guaranteed for all particles above 0.5 microns.

Detailed technical brochures dealing with bag filters and other types of dust collection and control plant such as electrical precipitators, wet arrestors and multi-cell cyclones can be had on request.

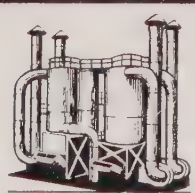
Section of  
Vibro Chamber Filter

99% efficiency — 0.005 microns and above	99% efficiency — 0.5 microns and above	99% efficiency — 3 microns and above	95% efficiency — 10 microns and above
			



Electrical Precipitators

*Holmes are equipped  
to deal with any dust  
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Wet Arrestors



Multi-cell Cyclones



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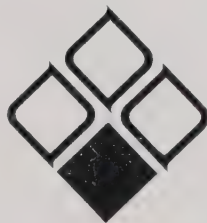
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Rexco looks forward to the day when smoke is a thing of the past—and the Rexco Group of Companies will be proud to have been pioneers in the process.



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# **SMOKELESS AIR**

**JOURNAL OF THE  
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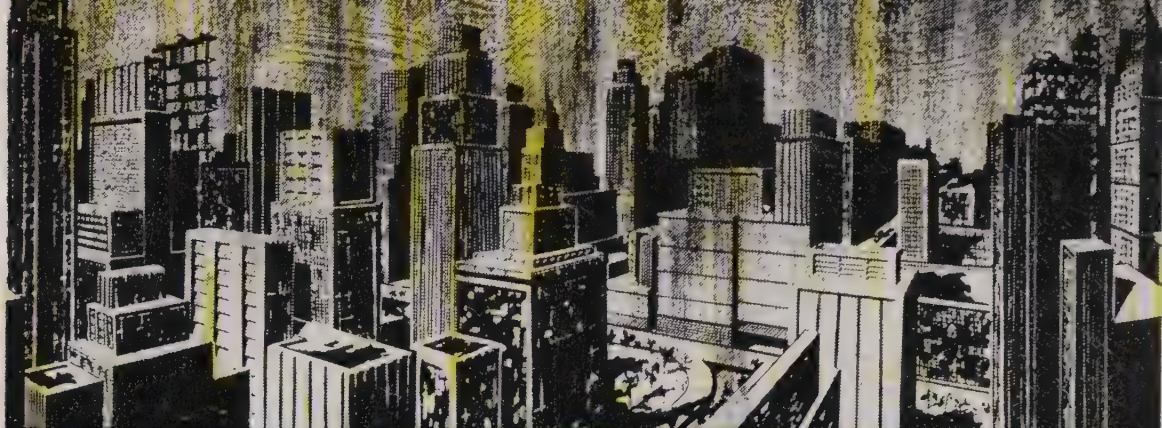


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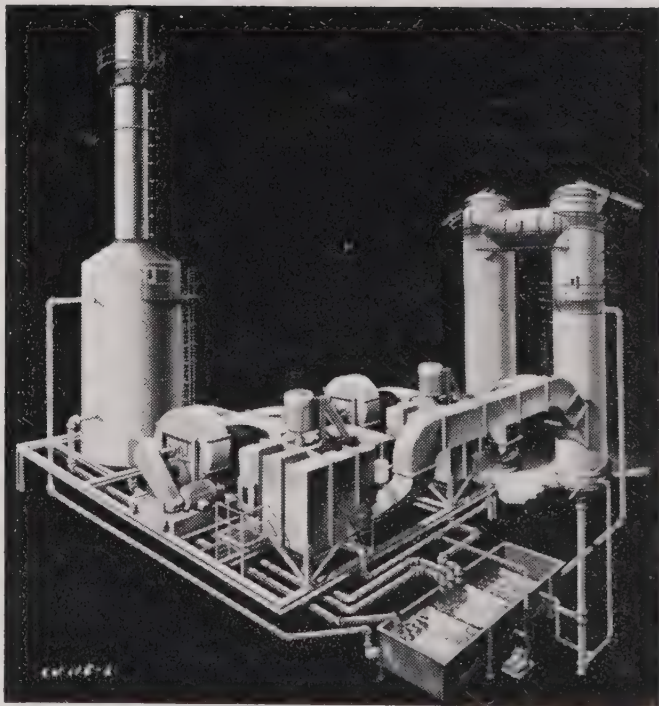
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... and be sure that your plant is doing all it can to prevent the release of dangerous air-borne contaminants.

Air pollution caused by industrial contaminants released in the air, can mar the beauty of your city and impair the health of its citizens. The Centri-Spray® Limited Air Engineering specialists will analyze your Air Pollution Control requirements, and design, build, test and install a complete Dust and Chemical Fume Control System to satisfy the most rigid Air Pollution Control Codes in your community.

Only a complete system designed for your particular Air Cleaning needs can give you assurance that all of your discharge air is free of damaging dust and chemical fume contaminants.

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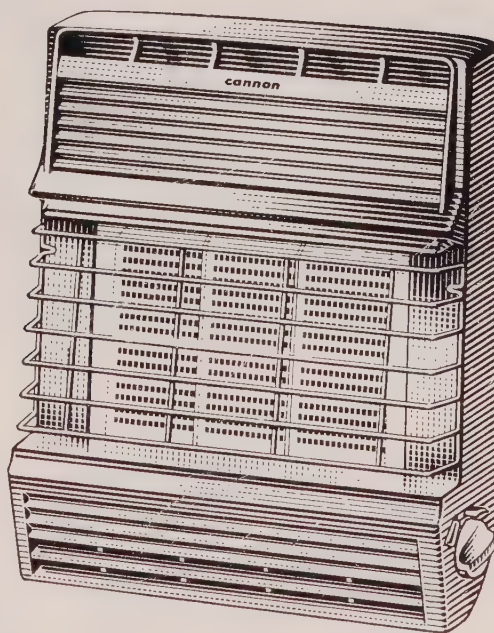
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# Information available for clean air campaigns



## EXHIBITION

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## MOBILE UNITS

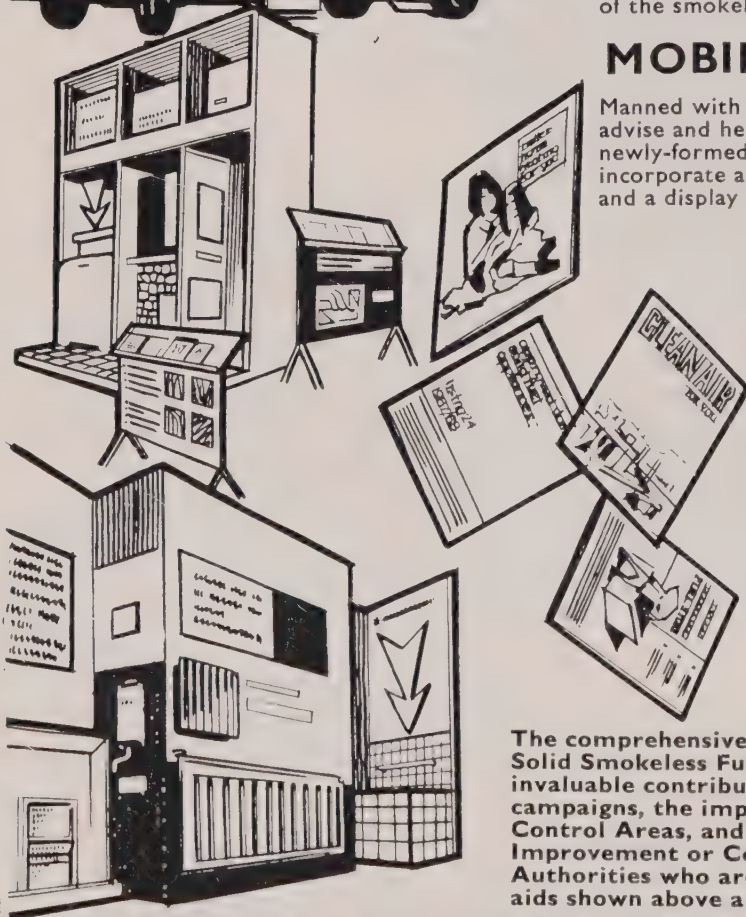
Manned with technical demonstrators, to advise and help residents in proposed or newly-formed Smoke Control Areas. They incorporate approved appliances under fire and a display of the solid smokeless fuels

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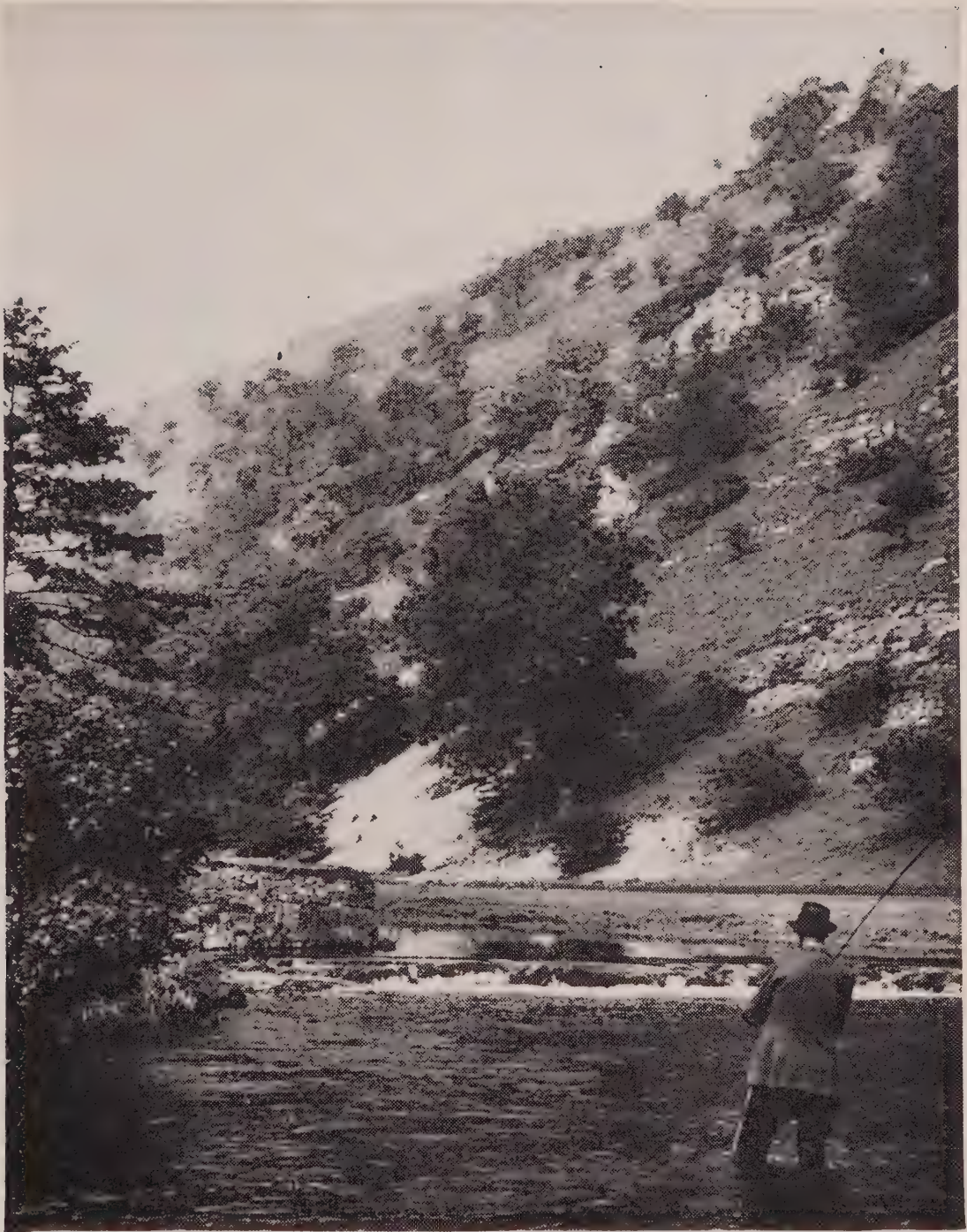
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**SOLID SMOKELESS FUELS FEDERATION**

York House, Empire Way, Wembley, Middlesex

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per day down there!"***



***"Well where's the smoke?"***



***"And where's the smell?"***



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The Universal system of incineration ensures complete combustion of all waste materials. Sealed flame, three stage combustion with complete air control to all stages eliminates air pollution emissions, without smell, smoke or fly ash. Refuse reduced to 5% clean, dry sterile ash with a low fuel bill. Universal incinerators are efficient, compact, precision engineered units complete with a stainless steel stack of only 30'. In addition, the incinerator is designed to dispose of bulk refuse through the front opening on a refractorised trolley taking articles of up to 6' x 4' x 8'.

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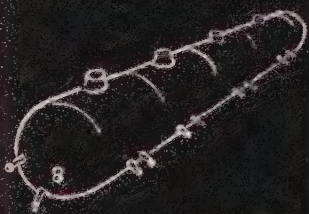
## **'OLDBURY' CHAIN GRATE STOKERS**

for efficient, smokeless combustion with  
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## **'AIRSPIN' OIL BURNERS**

of advanced design specially for use  
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# National Society for Clean Air

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# SMOKELESS AIR

Vol. XL No. 152

Winter 1969

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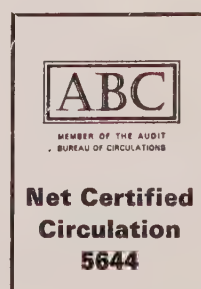
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*Ships, towers, domes, theatres and temples lie  
Open unto the fields, and to the sky:  
All bright and glittering in the smokeless air*

# SMOKELESS AIR

## Prince Philip's View

In a television interview screened in the United States on 10 November, Prince Philip was asked to state Britain's greatest challenge in the years ahead and chose social welfare and pollution. "The first challenge is the social problem—that of people's condition and human welfare", the Duke said. "The other is the environmental problem. I think the next few years will bring the most hideous problems with pollution."

## The Conference

A full report of the Conference appears later in this issue. What occurred is now back history but there were a number of innovations at this Conference and we would be glad to hear the views of our readers on them.

This year, for the first time, slides were used to illustrate what the speakers had to say. Generally, this seems to have been regarded as a good thing. Do you think it should be continued? The Open Session on the Tuesday afternoon at which people, mostly ladies, from organizations in and around Eastbourne were invited was an innovation. Do you think that this type of session should be continued? If so, do you think that there should be a discussion period at such a session?

The informal "get together", previously held on the Monday evening, this year took a new form in that through the courtesy of the Esso Petroleum Co. Ltd., delegates were able to enjoy a film presented by Mr. Nicholas Guppy. Would you prefer that an entertainment on these lines is arranged for future Conferences or would you prefer to have the informal party as previously? The Conference Dinner and Dance was not well supported. Do you wish that this function should continue? If so, are you prepared to support it by being present? The Conference Committee would be pleased to have your views on these subjects.

## The 1968 Clean Air Act

The remaining sections of the 1968 Clean Air Act came into force on the 1 October last and with them came a number of regulations and exemptions issued by the Ministry of Housing and Local Government. It is still too early to attempt to assess the effect of the new and changed provisions of this Act, but we all know that the Act is a step in the right direction and will help to improve the quality of our air. It is intended that the working of the Act should be discussed at next year's Conference at Southport. By that time some clauses of the Act will have been in force for about eighteen months and others for something just over the year, and it should be possible for delegates to have a very good idea about how the Act is really working; whether it is biting as intended and whether it is having the right effect.

## The Cost of London's Clean Air

It is reported that over £6 million has been spent by London Borough Councils on cleaning up the capital's air since the Clean Air Act came into force 13 years ago. The London Borough's Association comments that one of the results of this expenditure is a 50 per cent increase in the amount of winter sunshine during the 10 years since 1958, and at the same time there has not been a bad fog in central London since December 1962.

At the present rate of progress, the whole of Greater London should be subject to smoke control areas by 1978.

## Sunshine in the North West

An article by Mr. Gordon Manley in the *Guardian* on 4 August last indicates the progress that has been made in the North West towards cleaner air. Mr. Manley states that 40 years ago, the larger Lancashire towns were losing between 35 and 40 per cent of such bright sunshine as they might otherwise have recorded in winter, and 15 per cent in summer. "But now, Manchester's initiative in getting rid of the smoke begins to impress." There is jolly paint in St. Ann's Square: the Town Hall is clean: there are trees in Albert Square and there are spreading lawns.

Regarding Wigan, a much travelled English woman recently remarked amid the villas with their bright gardens, "What a very pleasant place". Since 1950, the measurement of bright sunshine in Manchester has gone up by about 15 per cent on what it was earlier in the century. Bolton has done even better and Blackburn now bids fair to have as much bright sunshine as Nottingham or Birmingham. Burnley, Darwen and Rochdale also appear to have improved their sunshine totals by something approaching 10 per cent.

Mr. Manley continues, however, that this is no cause for complacency and refers to the Great Preston Smell which can be readily picked up even in Blackburn.

Mr. Manley concludes "In the new clear air, assess the Lancashire accomplishment. The hayfields round Ramsbottom; the thoughtful Manchester architects that find cheap but splendidly accessible housing near Heywood: the view that now spreads down to Cheshire from Holcombe Hill; and the cheerfully comical mixture of green fields and grey factories, moorland and nonconformist chapels."



## Fading Sunsets

In recent issues we have reported on the benefits of clean air in the shape of more flowers blooming in our cities, more sunshine, cleaner polar bears and the like. However, we now hear that a theory has been put forward that sunrises and sunsets could lose their spectacular quality if local authorities continue to reduce the smoke content in the atmosphere. This is confirmed by a statement from a meteorologist who comments "coal fires discharge particles and these refract light which give the sunset and sunrise colours. Theoretically, smoke control could lead to lessening in beauty".

This is no doubt true, but at the present rate of progress in smoke control it will be a long time before we lose entirely the beauties of sunrise and sunset. In any event, most people will be grateful for the increased amount of sunshine in our cities brought about by cleaner air.

## Smokeless Zones

We are constantly reminded that there is nothing new under the sun. We are grateful to the Liverpool Echo for information that half way through the last century people were investigating the possibility of smokeless zones. In 1858 a man named Richardson of Liverpool, put forward an idea for dealing with smoke. Smoke from the chimney was led to an iron container erected in one of the upper rooms of the house. In this container smoke was washed by numerous jets of water with which it descended into a drain and so was carried away without rising into the air. Unfortunately, however, a number of people who tried it found that the jets of water were not sufficiently controlled and that this led to the house being flooded. Richardson then abandoned his scheme.

## New Secretary for South East

After serving the South East Division very faithfully and well for some six years, Mr. J. S. Hodgins has now handed over the duties of Secretary of the Division to Mr. R. F. Shapter of High Wycombe. All in the Society know how much work Mr. Hodgins has put in on behalf of the South East Division during his years of office and none more, of course, than members of the South East Division itself. We are all extremely grateful to Mr. Hodgins for what he has done.

We welcome Mr. Shapter as Secretary of the South East and hope that he will have a happy and useful term of office.

# EASTBOURNE CONFERENCE

The Society's 35th Annual Conference at Eastbourne in October, although the attendance was lower than in former years, was considered by nearly all who attended to have been a success. Generally, the papers presented were of a very high order. It is true that they did not please everybody, the criticism being that they were "too technical" for some delegates from some local authorities. Against this, it may be argued that the papers were not highly technical at a time when local authorities are themselves having to move more than ever before into the technical field and become more involved with air pollution from industrial processes.



Eastbourne Conference. The Platform at the Opening Session

This year, slides were used to illustrate what speakers had to say. There is no doubt that this innovation was welcomed, and it will, in future, be a regular feature.

As has already been said, the attendance was down. In all, 663 delegates registered; of these, 61 were day registrations. The low numbers were of disappointment, but were not unexpected. More and more conferences are being held these days, many of them in the Autumn; and many local authorities to whom we look for support are cutting down drastically on the number of conferences to which they send delegates. This year, in September, the Filtration Society held a conference and Dust Control Exhibition at Olympia in late September; a fortnight before our Conference, the Association of Public Health



Inspectors held their Conference at Eastbourne; and in the week immediately preceding the Clean Air Conference, an International Clean Air Congress and Exhibition, in both of which the Society participated, was held in Düsseldorf. There is no doubt that we felt the effect of these functions.



Eastbourne Conference. Mr. Iddison speaks at the Friday morning session, also in the picture Mr. S. Cayton and Mr. E. Burke

The Conference was also the victim of recent Government changes and pressing Government business. Because of changes in the Ministry of Technology, Mr. J. P. W. Mallalieu was unable to open the Conference as planned. His place was admirably taken by Lord Delacourt-Smith, Minister of State, the Ministry of Technology, whose address is published in full, later in this issue. Because of pressure of business in the House of Lords, at the last minute, the Baroness Serota J.P., Minister of State, the Department of Health and Social Security, was unable to speak to the Open Session on the Tuesday afternoon. This was undoubtedly a great disappointment to the five hundred or so ladies and gentlemen—mostly ladies—from various organizations in and around Eastbourne, who had attended. Lady Serota's place was taken by Mr. A. S. Marre, C.B., the Second Permanent Under-Secretary of the Department of Health and Social

Security, who delivered Lady Serota's address, which is also published later in this number. We are indeed grateful to Mr. Marre for stepping into the breach so nobly, but there is no doubt that his audience would have preferred to have heard Lady Serota in person. Notwithstanding this, the Open Session, ably chaired by Miss George, M.B.E., has been generally considered to have been "a good thing" and we are grateful indeed to the Ladies' Committee under the Chairmanship of Mrs. M. Willison who organized it and who put in so much hard work, and to Shell Mex and B.P. Ltd. who very kindly provided tea for 470 people.

The Mayor and Mayoress of Eastbourne gave us every support and were frequently in our midst. The weather excelled itself—except on the opening morning when fog delayed the arrival of the Society's Chairman, Dr. W. C. Turner and to a lesser extent, that of Lord Delacourt-Smith.

The Conference passed two resolutions, one concerned with pollution from road vehicles—to which reference had been made in the speeches by Lord Delacourt-Smith and Mr. Marre—and one concerning supplies of solid smokeless fuel about which there is unease and apprehension. Both resolutions were moved at the end of the closing session on Friday and both were carried *nem. con.* They read as follows:

"That, in view of the apprehension and unease represented to the National Society for Clean Air, this Conference urges Her Majesty's Government to ensure that the necessary supplies of solid smokeless fuel are available for existing and projected smoke control areas."

"That this Conference again urges Her Majesty's Government to introduce legislation in the immediate future to set suitable limits on the emission of carbon monoxide from petrol-engined vehicles and smoke emission from diesel road vehicles in accordance with the practical and relatively simple techniques now available to British Industry."

The social side of the Conference started with the evening reception on the Monday evening at which Mr. Nicholas Guppy presented a film about the aborigines in Australia. This function was very well attended. It replaced to a degree the old informal gathering but this did not prevent those who wished to do so gathering around the bar and generally getting together as before. This new type of entertainment on the Monday evening seems to have been welcomed by many delegates. The Civic Concert given by the Mayor and Corporation of Eastbourne was very well attended and much enjoyed by everyone present. We are very grateful to the Mayor and Corporation of Eastbourne for a very delightful evening. The Conference Dinner and Dance was not as well attended as we would have liked. Nevertheless, those who did attend thoroughly enjoyed themselves.

## Conference Publicity

Up to 10 November, 202 press cuttings have been received, from local, national and technical papers—the latter giving particularly detailed reports of the conference papers. On the opening day, a successful press luncheon at which members of the Conference Committee acted as hosts, was held at the Congress Theatre, Eastbourne.

During the conference, the B.B.C. "Panorama" programme interviewed Dr. S. R. Craxford of Warren Spring Laboratory and the Director, for an air pollution television programme planned for the end of November.





Lord Delacourt-Smith opens the Exhibition



The Society's Stand



## The Exhibition

The Twelfth Clean Air Exhibition, held under canvas in Devonshire Park, Eastbourne, was smaller than in recent years but proved to be successful, and presented visitors with a wide range of interesting exhibits.

The Exhibition was officially opened by Lord Delacourt-Smith, Minister of State, Ministry of Technology, who then, accompanied by the Mayor of Eastbourne Alderman Cecil F. Baker, J.P., Sir Kenneth Hutchison, C.B.E., F.R.S., President of the Society, and Honorary Officers of the Society toured the Exhibition, visiting all stands where the official party were shown the various types of equipment available for use in combating air pollution.

The Society's information stand attracted a large number of visitors, and many favourable comments were received regarding the new modular display unit.

An added and novel feature at this year's Exhibition was the Crompton Parkinson Electric Bus which was used to convey the official party from the Congress Theatre after the opening of the Conference to the Exhibition Hall, and continued to operate this service for delegates during the period of the Exhibition.



Lord Delacourt-Smith and the President, Sir Kenneth Hutchison, at the Exhibition.





The Mayor of Eastbourne, Lord Delacourt-Smith, the President and others at the Cancer Information Association Stand

## Technical Visits

When arrangements are being made for technical visits the host authority quite naturally limits the number attending. The sole reason for this is that when an installation is being shown to members of the public, it is essential to have expert guides handling only a few people at a time in the course of a visit. Except in the case of the visit to Crawley New Town, the Eastbourne Conference visits were oversubscribed, hence there was some disappointment experienced by delegates who registered late. We are grateful to members of the Executive Council of the Society and to Mr. T. Steel and Mr. E. Briggs for leading parties with such diplomacy and skill. Also to the host organizations for all the care taken to ensure that the visits achieved their objectives.

### Isle of Grain Refinery

A party of 35 delegates visited the Isle of Grain Refinery of British Petroleum Co. Ltd. A stop was made for lunch at the Royal Wells Inn, Tunbridge Wells; of short duration because of the long journey still to be undertaken. On arrival at the refinery, Mr. R. T. L. Mowll in charge of air pollution control, gave a short talk on the range of air pollution problems encountered in an oil refinery. He described the techniques in use to minimize and control the emissions in a modern oil refinery complex, and the prompt procedures whenever a plant received a complaint. These were fortunately very rare.



The refinery was toured by coach and various features were pointed out when stops were made. At one site the party alighted to see a demonstration of combustion control at a large furnace and also the response to a mock alert simulating a severe leak of ammonia vapours. The jetty, where the crude oil is brought in and refined products sent out by sea, was then toured. Storage tank farms were inspected and delegates were given a view of the floating roof tanks used for the storage of crude oil and light distillate products. These tanks ensure a minimal loss of vapour into the atmosphere. The sulphur recovery plant where sulphur is removed from middle distillates was next inspected. There was full discussion on the type of chimneys used in refinery processes and the perennial problem of the flare stack was considered. Delegates were able to view the main water handling systems of the refinery and saw the point of discharge into the estuary immediately adjacent to the yachting marina. It was emphasized by the guide that the fishing at this point was very good!

### **Crawley New Town**

Fourty-seven delegates took part in the visit to Crawley New Town, the tour of the town being conducted by Mr. T. Steel, Chief Public Health Inspector, Crawley Urban District Council.

The itinerary included one of the ten residential neighbourhoods, the Swimming Pool and Sports Centre, Old Crawley, the Industrial Estate (including the local National Coal Board concentration depot for solid fuels), the Town Centre and the Civic Centre. The delegates were then received in the Civic Hall by Councillor K. J. Bridgeman (Vice-Chairman of the Housing and Health Committee) and entertained to tea.

The delegates all appeared to be very favourably impressed by the quality of the environment attained in the New Town, and a sincere vote of thanks was given for an enjoyable afternoon.

### **Shoreham Cement Works**

A party of 29 delegates, under the leadership of Mr. W. L. Kay, were privileged to visit the Shoreham Cement Works. On arrival at the works, the party divided into three groups and were conducted round the plant. All present agreed that this visit had been most instructive. The policy of the Conference Committee in arranging practical visits of this nature is obviously appreciated by delegates.

At the close of the visit, Mr. T. Iddison expressed thanks to the management, the guides and the catering staff for a most successful and enjoyable visit.

### **Dungeness Nuclear Power Station**

The party of 38 delegates arrived by coach at Dungeness Station B. at 11.50 a.m. (10 minutes early) and were met by Mr. Boylan, Liaison Officer, C.E.G.B. Headquarters.

After a descriptive talk by the Station Superintendent, the party was arranged in four groups and conducted around 'B' Station in process of construction and scheduled for completion in 1971.

Advantage was taken to see into those parts of design and construction which in a working reactor would be "out of bounds" for obvious reasons. Questions were answered by the guides and a thorough appreciation of siting, design, construction, maintenance, fuelling and waste disposal was obtained.



On-site ancillary plant such as cooling, engineering workshops and labour and staff facilities, as well as the generating side of the station, were visited and inspected.

An excellent buffet lunch was enjoyed by all at the Jolly Fisherman, Greatstones, under the supervision of Mr. D. Smith, proprietor.

In the afternoon, the party returned to Dungeness and were conducted round Station "A" with guides provided by the Station Health Physicist. The numerous questions were answered in detail and after tea in the canteen the party, with thanks and appreciation to the Station staff, returned to Eastbourne by 6.30 p.m.

The journeys, coach and driver left nothing to be desired.

## **Ladies' Visits**

The programme of ladies' visits was arranged so that on each day of the Conference there was an opportunity to visit a place of outstanding beauty or historical interest within reasonable distance of Eastbourne. Some ladies, indeed some delegates as well, availed themselves of this opportunity more than once, but it was a pity that the coaches were not filled.

On Tuesday afternoon, a party of twenty, led by Mrs. G. Courtier, drove to the village of Hurstmonceux and saw the beautiful surroundings of the Royal Observatory. Tea was taken at Cleaver's Ling, a medieval building in the village after which the party returned to the contemporary scene and explored the new shopping precinct at Hailsham before returning to Eastbourne.

The Wednesday party of sixteen journeyed through the East Sussex countryside to the Elizabethan ironfounders house near Burwash which was, for many years, the home of Rudyard Kipling. Tea was taken in the restaurant within the old house and Mrs. G. Dhenin, who led the party, reported that the overall impression was of outstanding natural beauty all along the route.

On Thursday, a full day's journey was undertaken to Chichester where after viewing the Cathedral and other places of historic interest the party of eleven, led by Mrs. I. Winder, lunched at the Dolphin and Anchor before visiting the site of the Roman Palace at Fishbourne, considered the most notable archeological discovery of this century. The palace is the largest Roman residence yet found in Britain and the Museum that has been established on the site tells the history from its erection in A.D.43 until the final destruction by fire about A.D. 280.

Also on Thursday, an afternoon party of eighteen, led by Mrs. P. G. Sharp, travelled to the home of Lord Gage at Firle, a notable country house of Sussex, famous for its porcelain collection and domestic furnishings. Mrs. Sharp writes, "after a delightful drive along the foot of the Downs where we saw the giant figure of the Long Man of Wilmington cut in the chalk, we arrived at Firle. The beautiful house, part Tudor and part early 18th Century, lies in wooded parkland below Firle Beacon. It has been the home of Viscount Gage and his ancestors for nearly 500 years. A charming guide showed us round the beautiful rooms, telling us much about the history of the house and family, and we saw the magnificent collection of pictures, furniture and porcelain." After viewing the house and gardens, tea was taken at Drusillas before returning to Eastbourne.

# **The Golf Tournament**

Thirty-two players teed off with hope and, for those who could afford it, a new ball for the Golf Competition organized by the Solid Smokeless Fuels Federation at the Willingdon Golf Club, Eastbourne on Wednesday, 22 October 1969.

The weather could have been better; it was rather misty at the start, but this was just one more excuse that the players could use if their score was not as good as it should have been.

The Competition was won by Mr. J. T. Gibson from Bangor, Northern Ireland with a score in a Stableford Competition of 28 points. For the uninitiated his score was four strokes better than he was supposed to have played. As all golfers believe in the strict interpretation of the Handicap Rules, particularly when they apply to another golfer, the players were unanimous that Mr. Gibson's score be brought to the attention of his Club Secretary to ensure that his handicap is reduced.

The main prize, the S.S.F.F. Cup and Tankard, was presented to Mr. Gibson by the Mayor of Eastbourne, Alderman Cecil Baker, at the Conference Dinner, whilst the secondary prizes were presented at the Club House after the Competition by the only lady competitor, Councillor Mrs. G. R. Rowcroft from Bredbury and Romiley who, may I add, played a good game of golf.

The Second Prize was won by Councillor N. Parsons, also from Bredbury and Romily, with 37 points, whilst the Third Prize went to Mr. W. Bate from Cardiff who also had 37 points but was beaten over the last nine holes. The Fourth Prize was won by Mr. W. Williams of Caltex Services Ltd. with 36 points.

I am sure that all who participated in the Competition enjoyed a very pleasant afternoon and are looking forward to a repeat next year.

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## **Fuel Oil Firing Course 1969/70**

The National Industrial Fuel Efficiency Service announce that they will be holding fuel oil firing courses at Artillery House, Tilehurst Road, Reading, on the following dates:

9-11 December, 1969  
20-22 January, 1970  
17-19 February, 1970  
17-19 March, 1970  
14-16 April, 1970  
12-14 May, 1970  
24-26 June, 1970.

The fee will be £25 exclusive of accommodation and meals. Further details and enrolment forms can be obtained from N.I.F.E.S., Abford House, 15 Wilton Road, London, S.W.1. It is expected that many people will wish to avail themselves of these courses and N.I.F.E.S. advise early reservation.



# Opening Address

by

## Lord Delacourt-Smith

*Lord Delacourt-Smith  
Minister of State, The Ministry of Technology*

Mr. President, Your Worship, Ladies and Gentlemen.

On succeeding Mr. Mallalieu as Minister of State in the Ministry of Technology I was delighted to find that one of my first tasks was to have the privilege of opening this Conference this morning.

The large varied and representative attendance here is a testimony to the standing of the Society and a recognition of the value of the work which it has accomplished.

It has been a great achievement to inform the serious minded sections of the public of the dangers of air pollution and then energetically to marshal that informed opinion first to demand the establishment of the Beaver committee and then to carry through the Clean Air Bill to the Statute Book.

Since that day you have given effective help to successive Governments in maintaining enthusiasm throughout the country for the application of this legislation and it is with pleasure that I take this opportunity of thanking you for the important contribution you have made and are making to ensuring that life in this country is healthier and pleasanter.

The record of the Society is long as well as distinguished. You have passed long since your Golden Jubilee and indeed your Diamond Jubilee. This year the Society has reached the age of three score years and ten. This however is not time for its demise; indeed the Society's work is still needed and I am sure that there are many years of useful life ahead before it can say that its purposes have been fully accomplished.

At this opening session it seems right to me to turn very briefly to the wider problems of the pollution of the environment and to an important development which has taken place within the last few days.

This is of course the reference made to this subject by the Prime Minister in announcing the recent Ministerial changes. In describing the new responsibilities of the Secretary of State for Local Government and Environmental Planning he laid emphasis on the fact that Mr. Crosland would have special responsibility in relation to all aspects of environmental pollution. He is to co-ordinate the activities of the Executive Departments in this field and to consider what improvements in machinery are called for. I am sure that all the delegates here today will wish Mr. Crosland well in his new and important task and the assignment of it to him is an indication of the increasing importance rightly attached to the problems of environmental pollution.



Lord Delacourt-Smith opens the Conference

Mr. Crosland's appointment is also of course a recognition of the fact that a number of Government Departments are involved in this matter including the Ministry of Technology. My own Ministry has in fact no regulatory powers in this field. These are in general possessed by other Departments of which of course the Ministry of Housing and Local Government itself is the most important. In the Ministry of Technology however we have for some time recognized clearly a responsibility in this field both to support the regulatory functions of other Departments and to help industry to co-operate in the matter and further to ensure that in the development of technology any adverse effects are reduced. Indeed it is a major task of the Ministry of Technology—recognized as such since its foundation five years ago—to see that technology develops in such a way as to enhance and enrich human life in all respects and certainly to avoid or to minimize those aspects of technological advance which can produce effects that are disturbing, distracting or unpleasant.



It is clear that your Society has realized from the beginning the connection between technology and air pollution; then the degree to which it was bad and obsolescent technology that caused air pollution. Certainly the improvements that have come about in recent years have only been possible as a result of improvements in technology.

Industry of course plays a significant part in air pollution. This is recognized by your programme. Although industry's record in the last twenty years has been a good one your programme indicates fields which still give you cause for concern and I find it significant that industries have been invited to present their own case to your Conference—a new departure I think for the Society.

In fact it is the rate of modernization of industry that to a great degree controls the rate of reduction of air pollution. There can therefore be no doubt of the degree of responsibility of the Ministry of Technology for the state of the air even though it has no executive responsibility for the administration of Clean Air legislation. I suspect that this may have been in your mind when you invited me here as representative of the Ministry.

A focal point in our Ministry's concern with this matter is the Air Pollution Division of the Warren Spring laboratory. This has carried on one of the most important parts of the work of the former Fuel Research Station—the old co-operative survey in the reformed, rejuvenated and more comprehensive National Survey.

Many of you here today are representatives of Local Authorities and of others who work with the Warren Spring Laboratory in this investigation and I should like to thank you most sincerely for the help you have given and are continuing to give in this way. I know that this has involved you in expense and takes up a not inconsiderable amount of time.

However now that a sufficient number of years have elapsed to make a detailed examination of the data which has been accumulated worth while the staff of the Laboratory are finding the advice and detailed knowledge of the Local Authority officers of the greatest help to them. I hope that the links that have been forged have also proved valuable to the local people concerned.

I have seen the first few regional draft Reports and I am advised that—as I am sure will be the case—they will prove invaluable to the planning authorities.

While much has been done, much of course still remains.

The success that has rewarded our efforts in cleaning the air from the smoke is spectacular. For example the sun now shines in London as brightly as in the depths of the country outside, but the Reports from the Warren Spring Laboratory show that there is still a good deal more that needs to be tackled. The job that has been started well must be completed properly. There is still a long way to go before the North is made as clean as the South. Even in the South efforts must not be relaxed while any smoke remains since the medical verdict is that all smoke is potentially dangerous to those who are particularly susceptible to its effects. There is no safe limit.

But all the conditions are on your side. Modern industry produces no smoke in its factories and modern technology is providing clean refined fuels and other sources of energy at an economic price to replace raw coal for domestic heating. It is a joint responsibility, yours and ours to accelerate the modernization of our ways of life that is now made possible.

It should pay us to look carefully at the reasons for the successes so far achieved to see whether they can be used as a guide to future action against the remaining pollutants of the air. As I see it the success achieved is due to begin with to the overwhelming case there was against smoke. It was obvious to everyone so that public opinion supported the anti-smoke legislation and was prepared to pay the bill. And the Government of the day was wise in its turn in acceding to this pressure by applying technically known and available methods to the problem and not leaving its solution to long term research.

Now in the forefront of all discussions on air pollution is the question of vehicle exhausts. It has been particularly emphasized by Clean Air legislation introduced in recent years in the United States. In attacking this problem however we must carefully distinguish the different types of pollution, their sources and their effects. If we exclude carbon dioxide and water—which are harmless—the petrol engine and the diesel engine give exhausts which are quite different in nature and raise different problems.

California has taken the lead in reducing motor car exhaust emissions and has taken the lead because it has a particularly serious problem. Los Angeles suffers from a particularly irritating form of smog produced by a unique combination of environmental conditions, heavy traffic density and long periods of sunlight. Such conditions occur rarely in Europe and never so far as we know in the United Kingdom. What may be beneficial or necessary for Los Angeles may be irrelevant to the problems elsewhere. It is in fact in confined spaces or in certain climatic conditions that the exhaust from the petrol engine can produce dangerous concentrations of gases.

In the United Kingdom conditions the exhaust gases are quickly dispersed in the atmosphere and wide ranging tests here and elsewhere have shown that even in conditions of heavy traffic with dispersion made difficult because of high buildings concentrations of toxic compounds do not reach the point of danger to health. There is therefore no case against petrol engine exhausts on the grounds of health.

That, however is not the whole story and from the point of view of the smelliness of the atmosphere it may be desirable to limit the concentration of pollutants in motor car exhausts. The Government fully supports the activities of the United Nations ECE Committee which is studying the limits and methods of analysis and tests for contaminance in petrol engine exhausts. Our own Ministry of Transport takes an active part in the work of this Committee.

So far as diesel engines are concerned, there is no evidence that they emit exhaust which is harmful to health. Undoubtedly however the black smoke produced by a badly maintained diesel engine is offensive. Carbon particles and partially burnt hydro-carbons help create black clouds on our roads and add to the cost of maintenance of buildings and of vehicles. Whilst Government legislation has been effective in reducing this form of pollution we are not complacent about it; but the major problem is one of enforcing existing legislation on diesel vehicle operators. This form of pollution is also being studied by the ECE Committee and the outcome of their discussions could point the way to more effective legislation.



The second major category of air polluters consists of the whole range of objectionable trades and industries. At one extreme there is the small back street plant boiling meat products to the annoyance of the immediate neighbours. At the other there is the big factory which in some conditions may spread strange chemicals smells over a whole town if the wind is in the wrong direction.

These are probably quite harmless to health but they are nonetheless obnoxious and interfere with our enjoyment of our surroundings. They are probably no worse than in the past but as general standards have improved they have become more noticeable.

Forty years ago it may have been permissible to say—as a legal judgment did—that “What is a nuisance in Belgrave Square may not be a nuisance in Bermondsey” but the air in both places has improved a good deal since then.

No doubt further it can be claimed that in many cases “The best practicable means”—as required by the regulations—is being used to prevent or minimize the smell; but nowadays the best ought to be getting better all the time. This may well entail some greater expenditure on plant and equipment which will no doubt be reflected in the price of the product. But if the public want something badly enough and are willing to pay for it they can usually get it. My judgment is that one of the things which the public wants and will demand more and more insistently is an improvement in the physical environment in which daily life is lived.

The last of the remaining problems may well be that of industrial haze. We have all seen the situation in which a complex of plants and perhaps of the housing estates in which the workpeople live is covered by a hazy cloud through which the sun can hardly penetrate. Years ago Warren Spring Laboratory found that this industrial haze particularly associated with chemical plants was connected with the large amounts of ammonium sulphate in the mist and so could be traced back to escapes from the plants. Harwell have now confirmed this conclusion and made it more precise. I should like to see something done about this, if the cost does not prove too great, for nature gives this country little enough sunshine and we can ill afford to waste our modest allowance.

Thus there is no scope for the Society to rest despite its three score years and ten. Such Societies as this perform the task indispensable in a democracy of focusing and expressing public concern on problems which great numbers of citizens recognize but which without such organized expression as the Society gives might not so speedily become the subject of an effective legislative and administrative action. In congratulating you therefore on your past achievements and in indicating that there are still further fields for activity I wish every success to your proceedings.

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# **Presidential Address**

by

## **Sir Kenneth Hutchison, C.B.E., F.R.S.**

I count it a great honour to have been invited to become President of the National Society for Clean Air and it will be my purpose to help the Society to the best of my ability to achieve the aims for which it was founded. As we all know, much has been gained in the last ten years but I hope to show how much still remains to be done.

Ever since I returned to the gas industry after the war, I have been closely involved in the realization of what was the first of the Society's aims, namely the establishment of smokeless air in towns and cities. The Gas Light and Coke Company, where I was given responsibility for all by-products, was one of the largest and earliest producers of solid smokeless fuel, suitable for the newly designed gas ignited solid fuel grates. It seemed clear at that time that coke and gas were going to make a very big contribution to clean air while making possible much better heating standards in the home. When I went as chairman to the South Eastern Gas Board at nationalization, I found, if it were possible, an even more enthusiastic group of solid fuel producers, based on the example and practice of the former South Metropolitan Gas Company.

A tremendous amount of hard work had already gone into the technical and administrative measures required for setting up a solid fuel production and supply complex that would have the capability to reach every home in the metropolis. The London and Counties Coke Association—known perhaps to a few of those present here—and its enthusiastic officials, had already done great work in bringing together the many local gas companies prior to nationalization. The enthusiasm and drive of my predecessor as President of the Society, Sir John Charrington, made possible the full realization of these aims by securing active co-operation by the distributors of solid fuel, so that when the Beaver Committee enquired into the "smog" of London, it was possible to show to what extent domestic smoke emission could be reduced or eliminated by the use of gas industry products. Sir Hugh Beaver was another enthusiast for clean air and I came to know him well and succeeded him in another capacity in the field of chemical engineering. They both gave great support to clean air and were members of the Clear Air Council from its inception.

As time went on, new developments brought about a different solution of the problem of domestic smoke. The gas industry began to realize that it was tending to undervalue its main commodity, gas. The public and especially younger households, frequently out at work all day, were beginning to demand labour free,



automatic heating and were becoming less addicted to the traditions of the open fire. New methods of manufacturing gas from light oil made it possible to produce a non-toxic and sulphur-free gas more cheaply than ever before and this led to a dramatic increase in the use of gas for home heating and a new period of expansion and prosperity for the gas industry.

Through the long period of difficulty and recession, when public attitudes favoured electricity for convenience and oil for economy, the Gas Council had never doubted its ability to recover nor lost sight of the enormous benefits conferred by natural gas in the United States and later to a lesser degree, in Italy and France. Together with BP, they started to search for gas in the U.K. in 1953, without success, and then seeing the large quantities of gas being flared to waste throughout the world, they joined with American partners in the successful development of a transport system based on the liquefaction of natural gas.

The discovery of one of the world's largest gas fields in the Netherlands led inevitably to the conclusion that the right place to look for gas was offshore in the North Sea, this being supported by Professor Illing, our geological expert. We made our plans to take part in the search and we hoped, if encouraged by the results, to proceed to exploitation and development as soon as the necessary legislation had been passed. The outcome is well known and a total of reserves has been established which is capable of delivering gas for 30 years at a rate equivalent to three times the present size of the gas industry. The Council in, partnership with an American group, headed by American International Oil (Amoco) as operators, has had a considerable part of this success and for a relatively small initial expenditure, found itself in a position to bid for territories which have confirmed reserves of natural gas of which the Council's share must be worth £300 million or thereabouts.

This, the second revolution in ten years, gives the gas industry the opportunity to make an outstanding contribution to clean air through the supply of sulphur-free fuel to homes, offices and industries. We must not, however, be carried away by our own enthusiasm. The big finds came early and the last years have been less productive. The total of the reserves now established are equivalent only to 24 million tons of oil a year, say 10 per cent of the total energy demand of the country, and most of the rest will continue to be provided by coal and oil.

There is little doubt that this development will soon have eliminated all carbonizing plants and with them, one of the sources of solid smokeless fuel. I do not consider this too alarming because the manufacturers of the premium fuels will be only too glad to take up the challenge. Whole house heating is becoming a "must" and soon we shall see much of the primary objective of our clean air policy being achieved almost by free choice with much less emphasis on legislation. It is now 14 years since the Beaver Committee reported and 13 years since the passing of the Clean Air Act and it seems sometimes that we have come to the end of the road. Anyone who lives in London must realize what a change has come about in the last ten years so that we can now appreciate the beauty of our city when the bright clean air lights up our green parks and the newly cleaned stone buildings. The fact that the sulphur content has not followed to any noticeable degree and may, in fact, have increased is not apparent.

Whether or not sulphur is anything of a hazard to health, the effect on buildings and structures must still be serious, so that in spite of what I have said, this is no time for complacency and there are still many major problems, such as are only too evident in other parts of the country and indeed, in certain parts of London. It is very difficult to persuade or compel people living near to large industrial complexes that the small contribution from their own fireplace matters when seen against the larger and more obvious contamination flowing out of industrial chimneys nearby.

The theme and range of the Conference emphasizes the importance which must now be attached to realizing the aims of our Society in the field of industry. At one time I knew only too well that industrial processes like the operation of coke ovens and the manufacture of tar and ammonia products carried out within the boundaries of the then London County Council, while essential to the production of smokeless fuel, were not entirely free from objection themselves and could all too easily earn the wrath of our neighbours and the extreme displeasure of the Alkali Inspector. I can claim, therefore, to be aware of the difficult problems which arise when large integrated units of manufacturing plant are subjected to critical standards of purity for all their gaseous effluents at all times.

This Conference is directed towards the problems of some of the most important producing industries in this country and the speakers are fully representative of informed opinion in these industries. No doubt the audience contains many of those who have been critical of certain industries in the past, who will be anxious and willing to take part in the proceedings when the time comes for questions and debate. The recent centenary of the Alkali Inspectorate reminds us that effective legislation for *clean* air antedated by many years effective legislation for *smokeless* air although it is only recently that the former was extended to industries whose effluents, though obnoxious, were not deemed to be injurious.

Hitherto there has been a tendency to apply a test of injuriousness to a process, rather than to a product; for example, the sulphur dioxide emitted from a sulphuric acid plant would fall within the regulations whilst the much greater total quantities emitted from a power station would be ignored. Cures which were possible in a chemical works could involve a different order of costs at a steel furnace or a power station, due among other factors to the much greater dispersion of pollutant in the relatively harmless chimney gases. Thus, we are always driven back to the definition of what constitutes the "best practicable means", to which, I expect, can be added the rider "and at a cost not greater than the economic viability of the operation will permit". The policy of dispersal through high chimneys of the effluent gases from the burning of sulphur-bearing fuels represents the best that can be done at this time in industrial plants and power stations. Contact sulphuric acid plants on the other hand are required to attain a 98 per cent conversion of the sulphur they use.

These compromises are not unreasonable in an industrial nation, which must produce and sell competitively in order to provide food and other necessities of life. There is no point in setting up manufacturing standards which could put a large steel works out of action and deprive a community of the means to exist at all, for there is little comfort in breathing clean air in a derelict area.



What we should now do is to invite industry as a whole to take a more active part in assisting the Society to draw up aims and objectives, which are not only practicable (these would already come within the net of present legislation) but which could become possible given an incentive to more research and development. Would it not be possible for industry as a whole, and especially those sections where there is active competition between the members to draw up and publish a declaration of intent? This would really amount to little more than good neighbour policy as regards the air we breathe. There are of course, many other fields in which a good neighbour policy could be applied: the problems of water courses and the sea itself—the dumping of solid waste and the abandonment of derelict land—these are not for discussion at this Conference, although we can, I hope, show the way to a sensible treatment of the one that concerns us here today.

Wherever there is a concentration of industry in any country, the disposal of waste becomes a matter of national concern. I will be speaking later about international co-operation but meanwhile, in relation to the theme of “Good Intent”, I would like to quote from a declaration by one American oil company, whose operations are mostly in the centre of the American continent and often near large cities and centres of population. Standard Oil of Indiana has publicly declared its policy as follows:

“The Company and its subsidiaries, in all of their operations and activities, are dedicated to the best principles of management and conservation of environmental resources, including air and water. To implement this policy, we:

1. Establish and maintain controls for environmental conservation in company operations, facilities and products.
2. Engage in company research and co-operate with others in research on associated technological and medical problems.
3. Co-operate with all levels of government to seek efficient and practicable regulations, controls and enforcement.
4. Provide funds and competent personnel to deal energetically with all these matters.”

A significant and welcome development is the establishment of a Study Group for Clean Air and Water Conservation in Western Europe, which was initiated by British Petroleum and the Royal Dutch Shell Group in 1963. Membership, which is open to all oil companies, represents about 80 per cent of the refining capacity in Western Europe. The four objectives of the Group can be summarized as:

1. The collection and dissemination of information, scientific, technical and legal.
2. The promotion of co-operation between the partners to secure this information.
3. The provision of work programmes and funds to research institutes.
4. To make available to others the considered views of the Group.

The Group has gone a step further in setting up a formal organization, the “Stichting Concawe”, with headquarters at the Hague to give practical effect to its objectives, and is actively pursuing a number of important investigations, the results of which will be released in time to those who can most benefit.

There is a growing interest now in all forms of international co-operation towards the achievement of a better environment and by the time we meet at this Conference, several of us will have attended an International Congress in Düsseldorf, and will have had the chance to weigh up the possibilities of future co-operation on the European scale.

In Washington, in December 1970, there will take place the second International Conference on Clean Air and I sincerely hope that our Society and British industry will be able to make an outstanding contribution. You will remember that the first International Conference of this kind was held in London in 1966. Being in London, it was, of course, easy for us as a Society to participate and play our full part. I realize that it will not be so easy for us to do so in America; but it is important that the Society should play its proper part and that British industry and all those interested in the clean air movement in this country should be able to present to the large audience in Washington what we have achieved.

If this Conference at which so much attention is being paid to the problems of industry could lead, as I trust it will do, to more effective co-operation between industry and the National Society for Clean Air and within industry itself, along the lines already being pursued by the oil companies in Western Europe, a significant advance will have been made towards achieving the ends for which this Society exists.

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## A New Clean Air Film

### Traffic Polluted Air

The nation-wide publicity given to the *Which* report on the carbon monoxide tests made with students at the University of Sussex lends special interest to this new film. The opening sequences convey vividly the menace of vehicle concentrations in our cities as the camera pans from one build-up of vehicles to another.

The film next pinpoints the threat of large-scale emission in our streets as close-ups of exhaust pipes illustrate the nature of the problem to be explored. The effect of breathing carbon monoxide at ground level concentrations is shown as the selected "guinea pigs" complete a number of intelligence and reflex tests in a stationary car.

The concluding sequences are devoted to an explanation of the results of these tests. After careful analysis, the fact emerges that without exception the ability to react quickly has been impaired by the intake of carbon monoxide. The film poses the question—is an additional threat being added to motoring by the present levels of pollution in our streets?

The film has been produced by Mr. N. Gonzalez for the Consumers' Association to whom inquiries should be addressed. It is shot in black and white and the running time is 9½ minutes.



## EASTBOURNE CONFERENCE

# **A Clean Air Environment for the Future** by **A. S. Marre C.B.**

*Second Permanent Under Secretary of State.  
Department of Health and Social Security  
on behalf of*

*the Baroness Serota, J.P., the Minister of State (Health)*

I am very happy to have this opportunity to address you today, although to speak about a clean air environment for the future in the pleasant seaside resort of Eastbourne does not provide great opportunities to quote local examples. Even when the mists descend from Beachy Head there is not, I am sure, in Eastbourne anything which could be properly described as a smog. However, I intend to discuss not only clean air but general environmental pollution. It is increasingly being recognized that the problem of pollution is one which affects not only air, but river and lake and sea and beach and land, and that we need to consider the pollution of our environment as a whole.



Eastbourne Conference. The audience at the Open Session



Pollutants can affect our bodies either directly (and smoke as an irritant to the lungs is one example of this) or indirectly (by, for example, the consumption of food which contains the residues of agricultural chemicals). Pollutants can cause smog, give rise to offensive smells, make our buildings dirty and render our rivers and beaches unfit for recreation; they can destroy wild life, thereby breaking food-chains and also making our shorelines and countryside less attractive; they can directly affect our fisheries both in fresh and salt water.

The effects which the accumulation of pollutants in the upper atmosphere might have in bringing about changes in the earth's climate are only just being realized. This will be of particular concern to Eastbourne which at present enjoys more sunshine (if publicity from the Town Hall is to be believed) than many other parts of the country.

Environmental pollution is a particular problem of a technological age. Most industrial processes produce enormous quantities of waste-products which in the course of disposal often cause pollution. Mining operations often produce ugly accumulations of waste materials. The agricultural use of fertilizers, pesticides and other chemicals may lead to pollution. So can animal excreta. Ships near our coasts discharge oil and sludge, by accident or design, into the sea. The exhaust gases of internal combustion engines, and particularly the motor car, pollute the air. Normal domestic activities produce large quantities of refuse, combustion from heating appliances and sewage. Outside the home, litter is left to foul the countryside and wild life is destroyed. As our national wealth grows so will our output of waste products. If we are not vigilant and active, the situation will inevitably get worse.

Pollution is also a matter of international concern; the pollutants put into the air from the flues and exhausts of one country are liable to affect others. Radio-active waste and oil discharged into the sea may also have far reaching effects. As more countries change from an agricultural to an industrial way of life, the problems are aggravated.

Moreover the problem will grow as the world population grows and as our increasing population develops technological methods to produce the essentials of life.

Let me now refer to some particular kinds of pollution.

To secure the maximum yields of food in order to meet the needs of the growing world population the proper use of pesticides is essential. New substances are continually being produced and new uses devised for existing substances. But indiscriminate use of these valuable chemicals can have a harmful effect on the balance of nature; we all know about the toll of bird life which can occur if they eat grain seed treated with pesticides. Every beekeeper dreads the day on which his bees may be killed as a result of the spraying of fruit blossom without warning. On a more dramatic scale we have the occasional accident such as recently occurred on the River Rhine.

The Ministry of Agriculture, Fisheries and Food co-ordinates two voluntary Government Schemes to supervise the introduction of new pesticides and veterinary products and changes in the use of existing products. One of these is the Pesticides Safety Precautions Scheme. It safeguards human beings, livestock



and domestic animals against risk from pesticide products used in agriculture—and in this term I include horticulture—in home gardens and in food storage practice. The Scheme also minimizes the risks to wildlife. The second Scheme is the Veterinary Products Safety Precautions Scheme, which covers many products available to farmers for the treatment of livestock. The Government is advised on the operation of both of these Schemes by its Advisory Committee on Pesticides and Other Toxic Chemicals. Though these voluntary arrangements have worked well for some years, a mandatory licensing scheme to strengthen control is currently under consideration.

Every prudent mother when she takes her children to the seaside will wonder what happens to the local sewage. It is easy to over simplify the problem of sewage pollution of the sea. The methods of sewage treatment commonly employed by local authorities are designed to deal with the organic rather than the bacterial content and remove only a proportion of the organisms of disease. Therefore it could be more effective for some authorities to discharge sewage far out to sea rather than discharge a treated effluent near the shores.

With a growing population we are having to treat and use more river waters for drinking purposes. Thanks to the work of river authorities and the improved treatment of sewage by local authorities many of our rivers are now somewhat cleaner than they were a few years ago but some deplorable examples of pollution still exist. Despite sewage treatment and controls, new chemicals from industry may gain access to the rivers, and chemical fertilizers used on the land may find their way through the land drains into streams and rivers. To make an up-to-date assessment, all these problems of river and sea pollution are at present being considered by a Working Party set up by the Ministry of Housing and Local Government under the chairmanship of Mrs. Lena Jeger.

There is also the increasing problem of noise, which is really a particular form of air pollution. This problem was examined in detail by an expert Committee (the Wilson Committee) whose Report was presented to Parliament in 1963. One of its first tasks was to decide what noise was, since noise is very subjective. They accepted as the definition “Sound which is undesired by the recipient.” Thus, for example, Berg or the Beatles can be either music or noise to different people, or even to the same person at different times or places. The assessment of noise is a matter of complex human values and environments rather than of precise physical measurement. People vary in their susceptibility and adaptability to noise. Each of us may be annoyed by one noise but not by another of similar characteristics. A sound which most of us would ignore in the industrial part of a city might be very disturbing to us in the country or at night in a residential area.

The annoyance caused by noise is often related not to its actual intensity but to the information it conveys or the association or emotion it excites. A sound of small intensity—say a dripping tap—may become unbearable simply from repetition.

The Wilson Committee studied the effects of noise on health. The damage that can be caused to hearing by persons in occupations where they are exposed to high levels of noise was known and considered by the Committee. But when it came to consider the health of the general public, the Committee was unable to find evidence that noise normally met with domestically and socially produces

any direct and measurable physiological effect on the average person, although it could be an annoyance. They concluded that the general effect of noise on health must be more psychological than physical. However they found little specific evidence that noise caused mental or nervous illness.

But though there is no evidence that noise as such affects the health of the general public, there is no doubt that noise in the environment in which we spend our daily lives is a nuisance, is generally disliked and is tiring. The reduction of noise is demanded by the public and accepted as an objective by the Government. But noise reduction costs money. And even when all reasonable steps have been taken to reduce the loudest noises a community would not be completely free from noise annoyance because noise can have an emotional effect out of all proportion to its physical intensity.

The public are particularly concerned at the present time with aircraft noise. (Here I am discussing only civil aircraft since different considerations apply to military aircraft.) Public concern arises from the increasing size and number of aircraft, the need for a third major civil airport near London and the advent of supersonic civil aircraft. There are no easy solutions. But as air traffic is increasing every year the Government is determined to contain, and in the longer term, reduce the nuisance. Over the years a great deal has been done through operational controls. There has also been a great deal of research into methods of reducing engine noise and quieter engines are being brought into service. It is hoped to introduce as soon as possible an international scheme of aircraft noise certification which will *ensure* the application of the results of this research to aircraft production. New types of aircraft will require a Government certificate of their ability to meet defined noise standards. The first task is to cover new types of subsonic jets which offer the most immediate scope for noise reduction. But the aim is to deal with all aircraft. Supersonic civil aircraft will not come into regular service until the mid-1970s but the Government, in consultation with other countries, has already carried out a great deal of research into the problem of sonic bangs and this is continuing. The Government has powers to regulate or prohibit supersonic flights over the United Kingdom but in any case aircraft will not fly supersonically, nor will the bang be heard, within a hundred miles of the airports they use.

I turn now from noise to other forms of air pollution with which the National Society for Clean Air is more particularly concerned. I propose to mention one or two specific ways in which we are seeking to move towards a clean air environment for the future.

Coal smoke is still a most important air pollutant. For some 80 years the Society and its predecessors have been campaigning and working for its effective control. The mortality associated with the London smog of December 1952 showed the harmful effects of coal smoke during a period of fog, and research has established that urban smoke-polluted atmospheres are among the more important factors in causing chronic bronchitis. The domestic fire is the principal cause of smoke pollution.

The Clean Air Act of 1956 is largely devoted to the control of coal smoke. There are now over 3,000 smoke control areas in this country. In Greater London three-quarters of the premises are now in smoke control areas. Because



London's air is so much cleaner, azaleas and camellias now flourish where once only laurel and privet could cope with the besooted conditions, and London enjoys about a 50 per cent increase in winter sunshine. Westminster Abbey, Nelson's Column and other well known buildings have recently been cleaned. Because of the clean air legislation there is little risk that they will ever return to a grimy state. It is no longer necessary for us to wash down our white paint so often. It is now very much easier to keep our homes clean and of course the washing on the line stays whiter.

From the beginning of this month all parts of the Clean Air Act of 1968 will have been brought into operation. I will mention today only one of its provisions; the prohibition of the emission of dark smoke from industrial or trade premises except from a chimney—and I hasten to add that dark smoke from chimneys is controlled by the 1956 Clear Air Act.

Anxieties are often expressed about pollution by sulphur oxides, which accompany the burning of most fuels, because removal on a large scale is not yet practicable. Sulphur oxides are to be more fully discussed later in the Conference but the medical evidence we have in the Department suggests that the concentration normally present in our urban atmospheres creates no health risk. And because of the changing pattern of fuel use, concentrations of sulphur oxides in our cities are tending to fall. But although we have been unable to provide a medical hazard as an argument for their elimination, sulphur oxides can have a harmful effect on the physical structure of buildings. They are pollutants which we could do without.

Pollution of the air by emissions from industry is evident in many parts of the country. Although precautions are taken to exclude particular pollutants which would have a harmful effect on health, and control is constantly being tightened, there is often a serious loss of amenity. Even if one cannot pinpoint specific medical risks, such industrial areas also cannot be regarded as being satisfactory from a health point of view. Further advance in the technical control of such pollution must be our hope and aim.

Pollution by petrol and diesel vehicles has been under constant criticism in recent years. Here too, surprising as it may seem to many, medical research has not been able to pinpoint a health risk from vehicle pollution found in this country. But fumes from improperly maintained or badly adjusted diesel vehicles are unpleasant and repulsive, and although the numbers have shown a marked decrease in recent years there are still the occasions when one sees filthy fumes pouring out from a vehicle.

Petrol vehicle fumes contain quantities of carbon monoxide, a well known poisonous gas, yet measurements of street concentrations and, more important, measurements of its absorption by drivers of vehicles and other persons have not shown amounts which are sufficient to cause detectable harmful effect.

But all of us welcome the discussions which are at present taking place, and the research which is going on, aimed at limiting this form of pollution.

There is one other form of air pollution I must mention, where the risks to

health are undoubted and serious. It is the personal air pollution of the smoker. It is an established fact that the health of the cigarette smoker is being damaged by a habit which is far more dangerous to him or her than the air pollution in any of our industrial cities. We must lose no opportunity of bringing this home to him.

I want now to say a word particularly to the women members of my audience. The quality of life of women in this country has immensely improved over the past few decades. This improvement is due not merely to changes in the social climate but also to advances in technology. That is one side of the coin. The other sides are the fresh problems of pollution of our environment following in the wake of the technological advances. The increasing use of detergents provides a good example. Soon after detergents were introduced, foaming became a serious problem at sewage works and in rivers. Now, with willing co-operation from industry, this pollution has been overcome in most places. In all except a few heavily polluted rivers, serious foaming is rare because most detergents now in use decompose easily.

This is one example which shows we must not allow ourselves to be too depressed by the problems of controlling our environment. Our recent experience in respect of air pollution too is encouraging. As Sir Peter Medawar said recently in his Presidential address at Exeter to the British Association for the Advancement of Science, the deterioration of the environment produced by technology is a technological problem for which technology has found, is finding and will continue to find solutions.

There are in fact few polluting substances whether of air or water, soil or sea which we do not at present know how to deal with. And as new pollutants emerge if research effort is put into it, ways of getting rid of them too will become known. Speaking generally, therefore, the problem of pollution is not so much a question of how to prevent it but rather whether we are prepared to pay for its prevention. Some may prefer to accept the pollution or to do without the benefits of the process generating the pollution. If we want to enjoy the benefits but prevent the pollution the cost can be met in one or more of three ways. It can be met by the taxpayer, by the ratepayer or by a manufacturer whose waste products are causing the pollution. The first two ways are not popular with any of us. But if the cost falls upon the manufacturer, it inevitably puts up the price of his product. This is unwelcome at home. And abroad, if his overseas competitors are not also required to control pollution, his export prospects are reduced. This may damage our economy. This is one of the reasons why the reduction of pollution must be tackled internationally.

There have been a number of international conferences on general environmental pollution or on particular forms of pollution. Two years ago in Prague there was a symposium convened by the Regional Office for Europe of the World Health Organization on "The health effects of air pollution". Sixteen European countries participated. Dr. Martin, a Senior Medical Officer in my Department who is to take part in the Thursday afternoon session of this Conference, was elected Rapporteur for that Symposium which reached several interesting and valuable conclusions.



And in addition to the World Health Organization almost every other international organization whose field of interest impinges on general environmental pollution is playing an active part in studying the problem.

Let me now sum up. The question of a clean air environment for the future is part of a wider problem of dealing with many forms of pollution of the environment in which we live. This is a problem of great importance extending over the interests of many Departments and as you will know the Prime Minister has given Mr. Crosland special responsibility in relation to all aspects of environmental pollution. He will co-ordinate the activities of the executive Departments in this field and the Prime Minister has asked him as a matter of urgency to submit recommendations for improving the machinery for dealing with pollution problems. But pollution is not only a national problem: it is an international problem, and must be tackled also by international study and co-operation.

Because pollution of the air and of the environment generally is a topical subject, statements on the subject by scientists, politicians and other public figures can be assured of a good press. One of the most valuable functions of the National Society for Clean Air during its existence has been to provide a forum in which scientists can explain the real problems in simple language, pinpoint the fields in which progress is urgently needed and allay fears where proper investigations have shown there is no cause for alarm. The work which this Society does in the field of air pollution will we hope be followed in other aspects of environmental pollution.

The solution to the problem of pollution does not lie as some people seem to think in a simple return to nature. Nor does it lie in opposing technological advances which will improve our living standards. The solution lies, first, in the careful examination of new substances and processes as they appear to ensure that adverse effects on the environment are understood and remedies devised; second, in seeing that use is made of the results of this research, and that the necessary remedial action is taken. We are fortunate in this country in having researchers in the forefront. Nevertheless we must ensure that this research continues and that its results are applied. It is because the National Society for Clean Air has this forward looking approach and helps to stimulate us to exercise vigilance, whether we are professionally concerned with the problem or whether we are concerned as members of the general public, that I was delighted to accept the invitation to address you today.

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### **Dust Control and Air Cleaning Exhibition**

The Society participated in the Dust Control and Air Cleaning Exhibition held in the Empire Hall, Olympia, London, 23–26 September, 1969, and this proved to be a very successful venture by the Society.

Officers of the Society were kept busy dealing with the many visitors to the stand, and with sales of literature.

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# DOBETA and the Clean Air Acts

by W. A. Don, B.Sc., M.I.Mech.E., C.Eng., M.Inst.F.,

*Director, Domestic Oil Burning Equipment Testing Association*

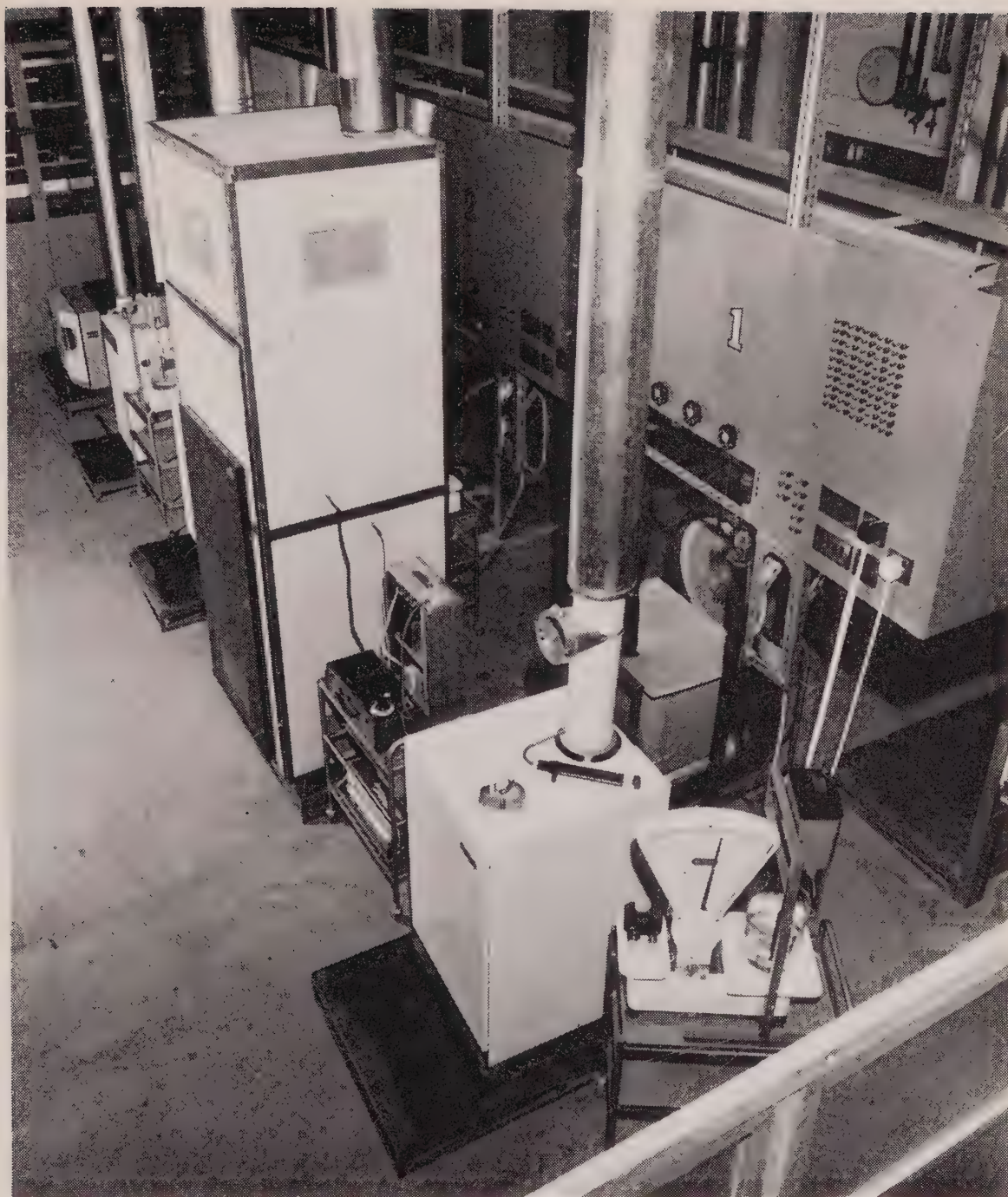
Oil burning has been an accepted feature of the domestic heating market for many years. But, despite the acknowledged advantages of a fuel that can be automatically controlled and which provides attractively low running costs compared with other fuels, oil-fired domestic heating has not made the impact which might have been expected of it.

Two factors in particular have retarded the growth of oil-fired heating. First, unlike gas, solid fuel and electric appliances, oil burning equipment until recently had never been subjected to comprehensive testing to universally agreed standards by an established independent testing authority. Consequently the intending purchaser, whether a private individual or a local authority, has been able to judge the quality and performance of an appliance only on the basis of manufacturers' claims. Second, publication of the Building Regulations 1965 revealed lack of knowledge and cognisance of the general performance and behaviour of oil burning appliances. As a result, those responsible for drafting the Regulations placed domestic oil burning equipment in the same category as solid fuel appliances. The oil industry protested that these regulations were unnecessarily onerous for the majority of oil burning appliances and were too inflexible. These representations were duly noted by the Ministry concerned, but the lack of an independent organization to supply the necessary technical data has delayed any further action to seek reclassification of oil burning appliances.

It was to establish just this kind of independent testing organization to provide the necessary data, and to provide authoritative and unbiased information for the prospective customer of oil burning appliances that DOBETA—the Domestic Oil Burning Equipment Testing Association—was formed on 4 January 1967.

DOBETA, a non-profit making association seeking to become self-supporting, is guaranteed by eight leading oil companies: Burmah Oil Trading Ltd., Esso Petroleum Co. Ltd., Gulf Oil (Great Britain) Ltd., Mobil Oil Co. Ltd., Petrofina (U.K.) Ltd., Shell-Mex and B.P. Ltd., Texaco Ltd., and Total Oil Great Britain Ltd. These companies also provide personnel for its working management. The British Standards Institution, The Fire Research Station, the Warren Spring Laboratory (these last two being within the Ministry of Technology) and the Building Research Station (within the Ministry of Public Building and Works) are represented on the Council Management. The initial task was of course the drafting of realistic and universally acceptable standards of safety, reliability and performance—always in that order of priority. The results, published in the DOBETA Approvals Manual, which is available to all concerned with oil-burning equipment, is acknowledged to be the most comprehensive document on oil burning appliance testing yet produced.





Part of the Dobeta Laboratory, showing appliances under test

An appliance which is submitted for testing—and only appliances submitted voluntarily by the manufacturers are tested—is first subjected to a preliminary inspection which includes an assessment of its general safety as regards design and construction. It is then put through a series of tests to assess its safety in operation, its reliability under service conditions and its performance as specified by the manufacturer. It is then run at a fixed operating cycle for a standard period of 60 days, during which its combustion performance is monitored continuously. Finally, it is inspected again for any signs of deterioration which might affect its safety and reliability.

Many of the test procedures and methods embody well known principles but there are a few which employ less known techniques and two of these are of particular interest to those in central and local government who are concerned with 'smokeless air'" and air pollution. These tests relate to the measurement of smoke and incomplete combustion.

### **Smoke index**

A domestic oil burning appliance must conform to the requirements of the Clean Air Acts, and every appliance submitted for DOBETA approval is tested to standards much more stringent than those specified in the Acts. Furthermore, as smoke produced in the combustion process can have a deleterious effect on the thermal efficiency of the appliance by fouling the heat exchange surfaces, DOBETA standards specify that the smoke number during continuous normal operation should not exceed a Bacharach figure of two. Although, it is recognized as unreasonable to expect an appliance to meet this standard during start-up and change of firing rate, it is clearly desirable that the smoke number should be allowed to exceed this figure for a minimum period of time. DOBETA has therefore introduced the Smoke Index as a means of assessing and limiting the performance of an appliance under these conditions. It is defined as the product of the true average smoke number and the time that this smoke number exceeds a figure of two. For example, if the true average smoke number is three for five minutes, the Smoke Index is 15. The characteristic trace of smoke numbers produced by an appliance may consist of a series of peaks and troughs and in these circumstances the conventional methods of spot-sampling is unworkable. By using a continuously reading smoke meter with the filter paper moving at two inches per minute, the smoke stain can be compared with the standard Bacharach scale at half-inch intervals along the trace, over the extent of the trace where the smoke number exceeds two. The average of the true smoke numbers multiplied by the time the smoke number exceeds two gives the smoke index.

### **Degree of incomplete combustion**

An allegation too often heard for a number of years has been that oil-burning appliances cause an unpleasant smell. It is unfortunate that considerable credence has been given to this, whereas in fact only a small proportion of domestic installations have given offence in this respect, and of these the majority have been or are amendable to correct adjustment and elimination of the fault. One difficulty in categorizing complaints of odour has been in quantifying the absolute conditions, as opposed to the subjective impressions. DOBETA has solved this problem by adopting one of the most sophisticated techniques yet employed in domestic appliance testing—the flame ionization test. In this test a flame ionization detection apparatus is used to sample the flue gases and record the quantity of any fuel vapour and fuel degradation products that may be present. This is taken as a measure of the odour-producing properties of the gases. Basically, the technique depends upon the principle that when organic materials are burnt in a hydrogen flame, ions (electrically charged dissociation particles) are produced, causing an electric current to flow between two electrodes. The current flowing depends upon the concentration of organic compounds in the flue gas sample.

### **DOBETA Approval**

While laboratory testing can establish that a particular example of an appliance is safe, reliable and that its performance meets its manufacturer's specification, to



ensure consumer satisfaction it is essential that production is in complete conformity with the model that has been tested and approved. To this end, DOBETA has established a system of factory surveillance, carried out on its behalf by the British Standards Institution. During each of two visits per annum, the Inspectorate makes a check on critical dimensions, materials of construction, etc. on one or more units selected at random from stock or the production line. It may be said that surveillance is a meaningless piece of bureaucracy, but experience over the years has shown that seemingly insignificant modifications to just one component can have far reaching effects on the overall performance of the appliance.

The manufacturer of an appliance which has satisfied DOBETA requirements is granted a Seal of Approval in respect of that appliance and this is normally valid for five years. DOBETA publish a quarterly List of Approved appliances and the Seal of Approval affixed permanently to each production equipment and inclusion in the List are the sole indications that an appliance has been tested and approved.

DOBETA has now been operating for almost two years and to date 24 appliances, out of those submitted for test, have been approved. Manufacturers of approved equipment have been quick to take advantage of their Seals of Approval in releasing details to the press and by advertising their products as DOBETA approved. A selection of these appliances, which have also been accepted for the Design Index of the Council of Industrial Design, have recently been shown at the Design Centre in London. Consumer associations have also been active in seeking further information to pass on to their members. And the appliance industries abroad are showing increasing interest in the activities of DOBETA.

Local authorities, whether or not involved in establishing a Smoke Control Area are now able to choose with confidence from the DOBETA List, knowing that these appliances have undergone comprehensive and searching tests and that, properly installed, they will be safe and reliable and that their performance will meet the manufacturer's specification. Such appliances having passed stringent combustion tests will satisfy the requirements of the Clean Air Acts.

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In September three Liverpool coal merchants were fined at Kirkby Magistrates' Court for selling by retail a solid fuel, coal other than the authorized fuel in a smoke control area. Three local residents were also fined for buying this coal. It is thought that these are the first prosecutions brought under Section 9 of the new Clean Air Act.

## **"Open Days" at Warren Spring**

The annual opportunity to view developments at the Ministry of Technology's Air Pollution Research Laboratory Warren Spring, Stevenage, took place on 6-10 October, 1969.

The variety of projects being undertaken by the laboratory ensured a large attendance of visitors on each of the open days. Of special interest was an experimental SO<sub>2</sub> Recorder for air pollution surveys using the conductimetric measurement method to estimate concentrations. In the prototype instrument shown, hydrogen peroxide, acidified to avoid interference from atmospheric carbon dioxide, absorbs the sulphur dioxide in a cylindrical cell of capacity 1-2 ml. The reagent remains stationary in the cell during the sampling time, usually 15 minutes. The air impinges on to the surface through a jet with an orifice of approximately 0.5 mm diameter, located about 1 cm from the liquid surface. To avoid splashing, the air flow through the jet is kept at 200 ml air/minute—under these conditions the point of impingement can be seen as a small dimple in the surface of the liquid. From this point of contact, the sulphuric acid diffuses quickly throughout the remainder of the solution. The efficiency of absorption is of the order of 95 per cent, the precise figures depending upon the rate of flow of air through the jet, its diameter and distance from the surface of the liquid (Nash, T., J.Sci Inst 38 480 Dec. 1961). At the end of the sampling period, the exposed reagent is flushed out and replaced by a fresh batch.

The instrument is normally operated in conjunction with a potentiometric paper chart recorder but data logging systems based on magnetic tape can also be used. Calibration is carried out by means of pure air containing known concentrations of sulphur dioxide. Two features of the recorder are of special importance. It can be modified to measure concentrations in flue and chimney gases as accurately as in the atmosphere. Quantity production is feasible and could give this country its first low priced SO<sub>2</sub> Recorder.

### **Automatic Alarm and Telemetry Station**

The small unit still maintained in London is now linked to Stevenage by an automatic telephone alarm. In the first instance this has been connected to a continuous SO<sub>2</sub> recorder (as used in the National Survey). When concentrations reach a high level the recorder (linked to the alarm unit) is switched on setting the automatic unit in operation warning the main station that alarm conditions prevail in London.

Methods of measuring 17 pollutants were shown as was a new data transmission system for dispersion work.

New automatic survey techniques aroused considerable interest as did the results of CO recording that the laboratory has carried out on sites located at Birmingham (Digbeth), Manchester (Princes Street), Enfield (Church Street), Glasgow (Bath Street), Cardiff (Queen Street) and Portsmouth (Commercial Road). Only three instantaneous results above 100 p.p.m. were recorded, and peaks above 50 p.p.m. were only of a few minutes duration.

Full details of all the above projects can be obtained, on request, from Warren Spring Laboratory, Gunnels Wood Road, Stevenage, together with a list of manufacturers of the equipment.



# News from the Divisions

## Yorkshire

A meeting of the Division held at Monk Fryston Hall on Tuesday, 24 June, 1969, at 10.15 a.m. was attended by 32 members and representatives. The Chairman, Mr. J. W. Batey, welcomed all new members to the Council Meeting and went on to say that he was very sorry to have to give the news to members that Mr. Arnold Marsh who had served the National Society for Clean Air faithfully for so many years has passed away and he asked members to rise in silent tribute. A formal letter of sympathy had been sent by the Secretary to Mrs. Marsh expressing the regrets of the members of the Yorkshire Divisional Council on the death of her husband.

During the business session, representation of members and smoke control progress were discussed. Mr. Batey asked members if any of their local authorities had had any successful prosecutions against coal merchants delivering coal supplies in smoke control areas. Members in reply said that: (1) In Hull the fuel merchants had been advised by the President of their Association to abide by the law and not to try any evasion. (2) All coal merchants within one area were given a copy of a list showing smoke control areas and areas which were proposed within the forthcoming two years. Any merchants found breaking the law in this area would be prosecuted. (3) People could always obtain supplies of coal in a smoke control area by purchasing them at shops.

The shortage of smokeless fuel which might arise in the coming winter was then considered. The Chairman asked if any members of the Committee had any information that would answer this question. No member had any definite information on this point and it was agreed to request Mr. Robertson of the C.U.C. to give details of the supplies likely to be available in the Yorkshire region at the November meeting.

After the Council meeting Mr. Laycock, the Liquefied Gas Officer of the North Eastern Gas Board gave a talk on "Glogas Liquefied Gas Service". He described Glogas as a liquefied petroleum gas (butane or propane) marketed by the North Eastern Gas Board in portable cylinders or by bulk tanker which could provide a gas service to people far removed from a towns gas main. The cylinder service provided all the normal domestic requirements, cooking, water heating, refrigeration and space heating. The bulk service provided a tank at the customers' premises and supplied propane by a tanker to it, so giving a full heat service for the rural cafe, public house, all types of catering establishments, industrial premises and the larger house. Tank sizes were 1 ton (500 gallons capacity) and 2 ton (1,000 gallons capacity). Installations could be as individual units or in multiples according to requirements, to supply one or several buildings.

Foundations were provided by the customer, and tanks were supplied on free loan subject to a minimum quantity of 3 tons of Glogas per annum being used, or bought by the customer. Mr. Laycock gave details of the price structure based on the quantity of gas delivered by Board tanker. Tanks were sited subject to the approval of Town and Country Planning, the Local Authority and Fire Prevention Officer.

Tanks also provided a means of supplying whole estates with piped gas, each separate house being metered and enjoying all the benefits of a complete heat service by Glogas. Gas was charged on estates through the meters at a rate which is equivalent to 2d. per therm above that for normal towns gas. The Chairman thanked Mr. Laycock for his excellent talk with accompanying slides.

Council members were then entertained to an excellent luncheon by the North Eastern Gas Board at Monk Fryston Hall.

*J. Goodfellow, Hon. Secretary*

## **East Midlands**

At the invitation of Messrs. Leys Malleable Castings Company Ltd., and the Derby County Borough Council, a meeting of the East Midlands Division was held in Derby on the 17th July 1969, seventy members attending.

In the morning, members were welcomed at the offices of Messrs. Leys Malleable Castings Co. Ltd., Colombo Street, Derby, by Mr. J. Hill, the Works Director. Mr. Hill expressed the Company's pleasure in this visit to the factory after 11 years for it gave those in the party who were present on the last visit an opportunity of seeing the efforts being made to reduce atmospheric pollution, albeit at considerable cost. Modernization and mechanization of the plant had resulted in coal consumption being reduced from approximately 1,000 tons per week in 1958 to almost nil in 1969. This together with the installation of improved dust arresting equipment, had made conditions in and around the works much more tolerable to the Local Authority and the nearby residents. Mr. Hill said his Company was in sympathy with the aims and objects of the National Society for Clean Air, and he hoped that members would also approve the contribution being made.

Members then toured this very extensive factory in which 2,300 tons of iron per week are melted in the production of malleable castings, largely for the motor industry. The comparative absence of dust and fume in melting and annealing departments since electricity and gas have replaced pulverized coal in the heating of the furnaces, was most noticeable. This, together with the modernization of the fume and dust arrestment plant carried out in the last ten years at a capital cost of over £340,000, demonstrated the Company's sincerity in tackling the serious atmospheric pollution problems invariably associated with this industry.

After touring various departments, members were entertained to lunch by the Directors of the Company. Before leaving the Works, a vote of thanks for the generous hospitality received, was proposed to the Company by the Deputy Chairman of the Derby County Borough Health Committee, Councillor J. B. Walker.



In the afternoon, the Annual General Meeting was held in the Council Chamber, Derby, at the kind invitation of the Mayor and the County Borough Council. Members were welcomed by Her Worship The Deputy Mayor of Derby, Alderman Mrs. E. Wood, who paid tribute to the work of the Society and to the support given by Mr. Dilworth when a member of the County Borough Council.

The chairman, Councillor F. Brothwell, referred to the death of Mr. Arnold Marsh, the late Director of the Society and paid tribute to his life's work in the cause of clean air, which had earned for him an international reputation in this field. Mr. T. Henry Turner who had been closely associated with Mr. Marsh as a member of the National Executive for many years also paid a fitting tribute to his life and work for the Society. All members stood in silent tribute to his memory.

The Honorary Secretary's Report for the Year 1968-69 was read. Councillor J. H. Gregory, Southwell R.D.C. was appointed Chairman, A. Wade, Esq., M.B.E., Deputy Chairman, Mr. G. Drabble, Honorary Secretary, Mr. H. N. Eardley, Hon. Auditor and Mr. V. Wales and Mr. W. R. Brownhill, Scrutineers.

The Honorary Secretary reported that 23 nominations had been received, necessitating a ballot to elect 18 members to the Divisional Council. The thanks of members were expressed by Mr. B. D. Hall of Southwell R.D.C., to the Officers and the Divisional Council, for their services during the past year.

The Chairman then introduced Mr. Barry Willison, Assistant Maintenance Engineer to Messrs. Leys Malleable Castings Company Ltd., who gave an address on the subject of "Prevention and Control of Atmospheric Pollution from large Foundries", the talk being illustrated with slides. Mr. Willison traced the various stages of the development in his foundry, from 1926 when the Company were pioneers in the use of pulverized coal in the melting furnaces which created dust and fume problems. In 1950 in a process of mechanization, cupolas with dust extraction replaced the old furnaces, and in 1968 the cupolas were equipped with spark and grit arrestors, and the fumes were discharged into a 150 foot stack. The annealing furnaces which were also fired with pulverized fuel have now been replaced by continuous annealing ovens, heated by gas or electricity, with the result that coal consumption in the various sections, which had been approximately 1,000 tons per week ten years ago, was now almost nil. Mr. Willison referred to improvements effected in dust extraction during the same period and described plant installed in the foundry in 1968 at a cost of £48,000 which replaced numerous small arrestors difficult and expensive to maintain. Dust, collected as slurry by this new plant, amounted to approximately 36 tons per week. In all, there were 61 dust and spark arrestors of various types throughout this factory installed at a total capital cost of over £340,000 and costing almost £39,000 per annum in maintenance. This interesting address provoked a lively discussion which was ably dealt with by the Speaker.

At the close of the session members were entertained to tea at the kind invitation of the Mayor and the County Borough Council of Derby.

The thanks of the meeting were expressed by the Chairman to the Directors and staff of Messrs. Leys Malleable Castings Company Ltd., for the excellent

arrangements made for the Works visit and for their hospitality, to the Deputy Mayor of Derby, Alderman Mrs. E. Wood, for her welcome in the absence of the Mayor, to the Derby County Borough Council for their invitation to the Division to meet in Derby and for the use of the Council Chamber and for the hospitality provided, to Mr. Barry Willison for his excellent illustrated address and to Mr. R. Davies, Chief Public Health Inspector and Mr. E. Raven, for arranging and organizing this very successful meeting.

On 25 September 1969, the East Midlands Division went beyond its own boundary for the first time to hold a meeting in Sheffield by invitation of the Lord Mayor and City Council. Sixty-four members were received by City Council Members and Officials, after which they were conveyed by coaches on a tour of the City to see the effect of the progressive policy of domestic smoke control pursued by the City Council during the last ten years. The first evidence of the transformation of this erstwhile dirty industrial city was to be seen in the Town Hall Square, where flowers bloomed and fountains played in the traffic roundabouts and the pleasant gardens adjoining the Town Hall, recently restored to its original beauty by the removal of the black grime of film which had masked it for 60 years. Leaving the city centre, members were taken to the high ground to the south of the city through areas of re-development where numerous blocks of high flats rose bright and shining from green lawns, comparable with any to be found in the new towns.

Geographically, the greater part of the city of Sheffield lies in the valleys of the rivers Don and Sheaf, and is surrounded by high ground on three sides. It was from this high ground on the Derbyshire boundry that members were able to appreciate fully the truly remarkable results of the clean air policy carried out in the city. Looking over the high density residential area it was impossible to detect visible smoke and there was a clear panoramic view over the city and the industrial east end to the hills eight or ten miles distant. Such conditions could not have been visualized ten years ago.

After a civic reception and luncheon given by the Lord Mayor of Sheffield, Alderman D. J. O'Neil, and the Lady Mayoress, the Lord Mayor, in an address of welcome, referred to the industrialists in Sheffield as "reformed rakes", who now shared in the pride of achievement in so cleaning the atmosphere in the city as to have earned the enviable reputation of the cleanest industrial city in the Western Hemisphere. He paid tribute to the enthusiasm of the Health Committee and the officials whose achievements so far were reflected in the health and happiness of the people. Replying to the Lord Mayor's welcome, the Chairman of the Division, Councillor J. H. Gregory, expressed the thanks of members for the kind invitation to visit Sheffield and for the generous hospitality provided. He said the tour made during the morning had impressed everyone, and had demonstrated the wonderful progress in clearing the atmosphere of Sheffield. The City Council and its officials were to be congratulated on the results achieved.

In the afternoon the meeting continued in the Council Chamber in the Town Hall with Councillor J. H. Gregory in the Chair.

After a business session, Mr. J. Batey, the Superintendent Smoke Inspector of the City of Sheffield, in a most interesting and informative address, explained



the progress made in Sheffield in the reduction of atmospheric pollution from both industrial and domestic sources. Outlining the growth and development of the steel industry in the City, from the Industrial Revolution, he spoke of the serious pollution problems created by the vast quantities of coal used, and stated that in the past more coal had been used in the 10 square miles in and around Sheffield, than in any other industrial city in Europe. Mr. Batey said that as early as 1819 attempts were made to control industrial smoke by imposing fines for burning coal furnaces without flues, and by threats of prosecution for emitting excessive smoke from steam engines, but he said the prosperity of the industry appeared to be more important than clean air, for one spokesman for the steel industry claimed, "he could see nothing in a clear sky but ruin".

A determined attempt was made to control industrial smoke in and around the City in 1927 when the Sheffield, Rotherham and District Smoke Abatement Committee was formed and specialist staff were appointed to carry out this work. With the passing of the Clean Air Act 1956, the City Council embarked upon a vigorous domestic smoke control programme, and now two-thirds of the City were under smoke control. Mr. Batey stated that at the present rate of progress the whole of the City would be subject to smoke control by 1972, the original target date. In addition to the visible evidence seen during the morning of the effect of the smoke control policy pursued, Mr. Batey gave some illuminating figures obtained from the atmospheric pollution deposit gauges and daily volumetric gauges maintained in the City. He stated that in 1933 when steel production in the City was approximately one million tons a year the deposit gauge in the east end of the City recorded 30 tons per month. In 1940 steel production rose to two million tons and deposits reached 40 tons per month; but in 1965 when steel production had reached three million tons, deposits in the same area fell to 20 tons per month.

The decrease in smoke pollution was more graphically demonstrated by the records from the daily volumetric gauges maintained in the city which showed that between 1955 and 1967, smoke pollution reduced from 330 to 98 micrograms per cubic meter, together with a corresponding reduction in sulphur dioxide pollution from 268 to 140 micrograms per cubic meter in the same period.

Mr. Batey's address provoked a very interesting discussion among members. Closing the meeting, the Chairman proposed a vote of thanks to the Lord Mayor and the Sheffield City Council, for the excellent arrangements made for the meeting and for the generous hospitality, and to Mr. Batey for his most interesting address and the manner in which he had dealt with members' questions.

*G. Drabble, Hon. Secretary*

## **South West**

The last meeting of the Divisional Council was held on the 31 July 1969 and the main item for discussion was the future programme of meetings. At least three meetings of the Division will now be held each year, the next meeting being held in Yeovil on 4 December 1969. The subject for this meeting will

be District Heating and a paper on this subject will be presented by a representative of Shell Mex and B.P. Ltd. This will be followed by a visit to an oil-fired District Heating installation at South Petherton.

The Annual General Meeting of the Division will be held in Bristol in March, and it is hoped to hold a further meeting in June at Winfrith Heath Nuclear Power Station. This programme, it is hoped, will prove attractive to members of the Division and result in larger attendances at meetings. Consideration is being given to the future activities of the Northern Area Committee of the Division and some thought is being given to make an Avonmouth/Sevenside Air Pollution Liaison Committee its main activity. With the existence in this area of major industrial complexes involved in zinc smelting and the manufacture of carbon black and fertilizers, and the considerable expansion proposed for the area, it is felt that a Committee of this kind with representatives of the various industries would be most useful.

A Conference and Exhibition was held in Bristol during September by the District Heating Association. A paper on air pollution and district heating was presented to the Conference by Mr. Alan Mister on behalf of the Society, and a most attractive Information Stand was manned by representatives of the South Western Division. Although attendance at the Exhibition was rather low, considerable interest was shown in the work of the Society and the exercise was a useful one.

*C. J. Creech, Hon. Secretary*

## South Wales



Members of the South Wales & Monmouthshire Division at Aberthaw Power Station (photograph reproduced by courtesy of "South Western Power")



A meeting of the Division was held on 16 July last at the Aberthaw Power Station. The 50 members were welcomed by Mr. D. McFarland, Group Manager, (Severnside) and Mr. Batchelor, Station Superintendent. Following coffee, a short business meeting was held. Mr. K. P. Christie of the Efficiency and Testing Department gave a talk on methods adopted for grit and dust arrestment at the Aberthaw Power Station. The paper was extremely interesting and created much discussion from the members, especially on the efficiency of the electrostatic precipitators in comparison with the A and B Power Stations. After lunch members divided into small groups and toured the Station.

Before departure, Alderman J. H. Warren, Port Talbot, member of the Executive Committee, thanked the representatives of the Generating Board for an extremely informative talk and visit, and for the hospitality shown. Mr. Batchelor replied on behalf of the Generating Board.

*L. Morgan, Hon. Secretary*

## **South East**

On 12 June 1969 at the invitation of the North Thames Gas Board a party of 17 members of the South Eastern Division visited the Methane Gas Terminal. The party was conducted over the installation from the jetty at which one of the special ships was moored, to the storage facilities for the gas. It was possible to see the original storage vessels above ground and the details of the unique form of construction of the underground gas holders. It is, of course, appreciated that the importance of imported methane from North Africa has diminished by reason of the subsequent discovery of gas under the North Sea. However, the Canvey Island installation still has an important part to play as in addition to providing the local supply, gas is also fed into the grid at times of peak demand.

An excellent luncheon was prepared and served by the staff of the Terminal. The afternoon session was devoted to talks given by the Board's Officers who were concerned with the conversion of domestic appliances at Canvey Island and which is now proceeding throughout the country. After the amount of adverse publicity given on radio and television it was interesting to hear of the extent of the preparatory work involved, from the testing, research and development in the laboratory, to the actual conversion of the appliances in homes and factories.

Questions were asked about the difficulties and it was stated that on the very few occasions where the consumer was not immediately satisfied the trouble was invariably due to a request to convert very old and obsolete appliances. The thanks of the visitors were extended to all those concerned in providing a very interesting and enjoyable occasion.

Thirty-five members had a most interesting day at Oxford on 26 June.

In the morning the party was received by the Lord Mayor and took coffee with him at the Town Hall. Members were then conducted round some of the Colleges by one of the Oxford public health inspectors who made a big impression with his knowledge of Oxford and its Colleges, his fund of anecdotes and the accomplished manner in which he performed his task.

The party was entertained to an excellent lunch by the British Leyland Motor Corporation and then made a tour of the factory, concentrating on those operations likely to give rise to air pollution.

The huge spray shop where car bodies are painted was of particular interest. In the past considerable trouble had been experienced from this plant but this had been largely overcome by new methods of fume arrestment. The boiler house and the unit investigating car exhaust emissions were also visited and finally the car assembly lines showing the stark reality of industrial automation in this advanced form of application.

A thoroughly enjoyable day ended with tea, during which members of the Company answered many questions put to them by members of the party.

On 29 July 1969, a party of 32 representatives and members were the guests of Shell-Mex and B.P. Ltd. on a day's visit to the Shellhaven Refinery, Essex.

They met at Shell-Mex House, Strand, and were taken by coach to the refinery, where the party were given an introductory talk on the layout and development of the works and the processes carried out. The party saw large tankers unloading at the quay and had a conducted tour of the refinery. Of special interest was the control room governing all the processes throughout the plant. Noticeable features of the automated processes were the comparatively few men seen in the works and hardly any signs of oil.

The party were impressed by the efforts made to prevent nuisances arising from the refinery. The Company entertained the party to lunch and thanks were expressed by the Chairman of the South East Division.

On 15 October 25 members inspected the N.C.B.'s "Housewarmer" appliance installed in a private dwelling at West Hampstead. The appliance, which is similar in appearance to a glass fronted room heater, was burning washed-singles butuminous coal (the fuel for which it was designed and the only fuel on which it will operate successfully). In addition to space heating in the room in which it was installed, four radiators in other rooms and domestic hot water were being supplied. Members kept a careful watch on the chimney stack and were satisfied that if operated with reasonable care no smoke need be emitted.

The fuel, which is supplied in 56 lb. plastic bags, is currently costing less than £13 per ton and is stated to be in plentiful supply.

Members found the fan, which is incorporated into the appliance, rather noisy but the householder (who has no connection with the N.C.B.) expressed complete satisfaction with the appliance.

*J. S. Hodgins, Hon. Secretary*





Sir Stephen McAdden C.B.E., Member of Parliament for Southend East, was an interested visitor to the Dust Control and Air Cleaning Exhibition held at Olympia on 23 September. Here he is seen discussing technicalities of the Mikro Airetron Gas Scrubber with Mikropul Sales Manager, Mr. W. G. Foot and Mr. F. E. Frey, Technical Sales Manager, Pulverizing Machinery, Summit, New Jersey.

# REVIEWS

## **National Coal Board Report and Accounts for 1968-1969**

*H.M.S.O., respectively 7s. and 17s.*

In 1968/69 the Coal Board made an operating profit of £28·6 million but after paying interest charges of £37·5 million to the Government this resulted in a deficit for the year of £8·9 million.

In spite of the contraction of the Coal Industry's capacity in accordance with the Government's White Paper on Fuel Policy, as a result of which 59 collieries were closed or merged during the year and there was a loss in man-power of 46,000, coal consumption including exports rose during the year and exceeded the previous year's total for the first time for five years.

Deep-mined output from the Board's collieries was 153 million tons, 9·7 million tons less than in the previous year; production at open mined sites amounted to 6·6 million tons and from licensed mines and other sources, 1 million tons were produced.

Overall productivity rose rapidly during the year from an average in 1967-68 of 39 cwt. a man-shift to an average of 42·5 cwt. a man-shift in 1968 to 69. This has been achieved by improved efficiency and increased use of mechanical means. The Report states that almost all deep mined coal will be produced by mechanized methods by 1970. The Report continues that it is essential to the Board's policy to ensure that productivity in the industry continues to increase rapidly. "This will be achieved by the more intensive use of proved techniques and equipment to giving increasingly high levels of machine performance, the removal of impediments to high productivity by the introduction of new methods of planning and operation, and the progressive elimination of uneconomic capacity".

The Board sold 21·8 million tons of solid fuel on the domestic market. Sales of bituminous house coal fell by 1·5 million tons, but the sales of naturally smokeless and manufactured fuels increased to 4·6 million tons. The Report comments "the spread of smoke control areas and the continued growth of central heating based on boilers and room heaters contributed to the increased use of smokeless fuels".

Almost a quarter of a million central heating appliances and systems were sold during the year. Room heaters seemed to be the most popular item.

## **The Gas Council, The Twentieth Annual Report 1968-69**

*H.M.S.O., 19s. net.*

The year under review has been an outstanding one for the gas industry. Sales reached a record of more than 4,600 million therms—an increase of 11·1 per cent; major industrial contracts for the supply of natural gas were negotiated; three major contracts for the supply of North Sea gas were signed; appliances belonging to 418,000 customers were converted to burn natural gas.

The industry earned a record surplus of £17·5 million compared with a deficit of £12·9 million in 1967-68.



The increase in domestic sales was 14 per cent, that to commercial consumers 7 per cent, and the industrial sales increase 7 per cent. Although industrial expansion related mainly to town gas sales, this prefaced the rapid programme of conversion to natural gas.

Although cooker and gas fire sales fell, gas central heating boiler installations increased by 20 per cent and warm air units by 8 per cent. Development of the "Guaranteed Warmth" central heating scheme was the highlight in domestic marketing.

So far as gas for industry was concerned, an important feature was the negotiation of a contract between the Gas Council and Imperial Chemical Industries Ltd., for the sale of about 900 million therms per annum of natural gas for 15 years. Further, the first national negotiations by the Gas Council on behalf of all 12 Area Boards were with Associated British Foods Ltd. These covered the eventual supply of natural gas for confectionery making, bread baking and steam raising at all its factories.

Among the major loads for natural gas negotiated during the year were supplies to the new Alcan smelter at Lynemouth (Northern Board), the Stewarts and Lloyds plant of the British Steel Corporation at Corby (East Midlands Board) for furnace firing, the Erdington plant of the Dunlop Rubber Company (West Midlands Board) for vulcanizing and the Brierley Hill works at Round Oak Steel Works (West Midlands Board) for billet heating, soaking pits and general steel works use.

The West Midlands, Eastern and Southern Boards started the conversion of gas appliances to burn natural gas during the year, so making seven in all. The conversion rate increased from 3,000 to 12,500 customers per week at the end of the year by which time 469,493 customers had been converted.

#### *Natural Gas*

The Council continued to participate, through its subsidiary company Gas Council (Exploration) Ltd., in seismic surveys by the Gas Council/Amoco Group.

The Group constructed three permanent drilling platforms on the Leman Bank field and by the end of the year, 16 wells on that field were ready for production. Work continued on the associated production platforms immediately adjacent to the drilling platforms and connected to them by a pipe bridge, and one of these was completed by the end of the year. A 30 inch submarine pipeline about 40 miles in length was laid from the Leman Bank field to the shore terminal at Bacton.

At the end of the year, the Council was satisfied that sufficient recoverable gas reserves in all proven fields could sustain an average flow of up to 3,000 million cubic feet per day for 20 to 30 years.

The first two stages of the shore terminal at Bacton were completed during the year and enabled gas to be accepted from the Shell/Esso Group, the Gas Council/Amoco Group and the Arpet/Phillips Groups.

Supplies of gas by the Shell/Esso Group from the Leman Bank field began in August 1968, the rate of supply rising to 340 million cubic feet a day by the end of January 1969; but it was interrupted in the following month because of difficulties on the off-shore platform and the supply was only partially restored by the end of the year. Supplies of gas by the Gas Council/Amoco Group from the Leman Bank field began in April 1969.

Supplies to the Easington Terminal by British Petroleum from the West Sole field continued satisfactorily throughout the year.

Seismic surveys were carried out during the year in partnership with Home Oil of Canada Ltd. in Yorkshire and with British Petroleum in Dorset, Hampshire, Lincolnshire, Surrey and Yorkshire. Planning of the development of the Lockton field was initiated, including design of the processing plant necessary to enable the gas to be delivered into the Council's national transmission system, in co-operation with Home Oil of Canada.

More than 380 miles of pipelines were completed during the year, bringing the total length at the end of the year to 1,072. The industry's demand for large diameter steel pipes exceeded home production and orders had to be placed overseas.

Further detailed technical and economic appraisals were completed by the Council on underground storage in aquifers. Preliminary assessments were made of the storage of gas at high pressure in underground cavities. The first three frozen ground storage units for liquified natural gas at Canvey, each of 21,000 tons capacity, were commissioned and by the end of the year, work on the fourth unit was at an advanced stage.

### *Gas Available*

The aggregate quantity of gas available during the year was 5,165 million therms, an increase of 11 per cent over the previous year. This included 160 million therms of natural gas supplied direct to consumers.

The maximum daily production capacity at the end of the year was 6,792 million cubic feet, 33.5 million therms. Output was concentrated in the more economic plants and the number of works in operation was reduced during the year from 192 to 170.

During the year, Area Boards constructed 880 miles of steel pipelines in making further provision for the receipt of natural gas from the Council's transmission system and in extending and reinforcing their own systems. Boards also constructed 2,420 miles of cast iron and ductile iron mains for the purpose of extending and reinforcing local distribution systems.

### *Economic Planning*

Three major North Sea gas contracts were signed during the year. The first was with the Arpet Group of companies for its share in the Hewett field. The terms were identical with those of the contract signed in March 1968 with the Phillips Group, the prices being 2.870d. per therm for the basic quantity and 2.025d. per therm for gas taken above that quantity. Both contracts are for a period of 25 years. Supplies from the Hewett field by the Phillips and Arpet Groups are expected to build up to 600 million cubic feet a day.

In December 1968, the Council signed contracts with the Shell/Esso Group and with the Gas Council/Amoco Group for their respective shares in both the Leman Bank field and Indefatigable area. All of these contracts are for a period of 25 years.

The Shell/Esso Group began to deliver gas from the Leman Bank field in August 1968, the contract becoming fully operative from October 1 1968. Since the end of the year, supplies by the Gas Council/Amoco Group have begun. The total quantity delivered from this field is expected to build up to 1,000 million cubic feet a day by 1971/72 and later to a level of approximately 1,500



million cubic feet a day. For the first 15 years the Gas Council will pay a price of between 2·830 and 2·870d. per therm, and thereafter between 2·750 to 2·870d. Gas taken above the basic contract quantity in any year will be paid for at 2·025d.

Supplies from the Indefatigable Area are expected to begin in 1971. The total quantity delivered from this area is expected to build up to 400 million cubic feet a day by 1972/73 and later to approximately 550 million cubic feet a day. Until September 1984 the contract price will be 2·900d. per therm and thereafter will be between 2·780 and 2·900d. depending on the amount taken. Gas taken above the basic contract quantity in any year will be paid for at 2·025d. per therm.

### *Financial Results*

There are three major reasons for the improvement in this year's financial results: the total cost involved in purchasing, manufacturing and supplying gas to consumers showed a reduction of 0·43d. per therm from 23·15 to 22·72d. per therm, there was an increase in gas sales of 11·1 per cent, and gas income reflected the effect of the gas price increases introduced in April 1968.

All Boards contributed to the Industry's overall surplus—by amounts ranging from £42,000 to £5·2 million. Of the four Boards with deficits brought forward from 1967/68 only two carry forward deficits into 1969/70—Wales (£162,000) and South Eastern (£2·7 million).

The industry's average gross return on net assets was 10·9 per cent, a figure greater than the 10·2 per cent financial objective set by the Minister of Power in the autumn of 1967.

Total capital investment amounted to £225 million.

Conversion to natural gas, on which £33·3 million has been spent to date, cost £26·4 million during the year.

All the Council's exploration and development activities for natural gas in the United Kingdom, and on the United Kingdom Continental Shelf, are undertaken by a wholly owned subsidiary, Gas Council(Exploration)Ltd. Advances made to the Company during the year amounted to £9·8 million, making a total of £15·8 million since the Company was incorporated.

The additional income from gas sales represented an increase of 17 per cent over the previous year. In turn, this was due to both the greater level of sales achieved and the higher tariffs applicable for most of the year.

The average income per therm sold for the main classes of consumer rose from 22·47d. to 23·68d: but although revenue costs rose by £36·7 million in the year, the increased gas sales meant that the cost per therm sold dropped by 0·43d.

### *Personnel*

The number of employees fell again during the year—by 2,544 to a total of 120,240: 64,310 manual workers and 55,930 staff.

### *Research & Development*

The reorientation of the Council's research programme caused by the rapid entry of natural gas has continued. Work on transmission and distribution has steadily grown as the industry has undertaken the most extensive pipelining programme in its history, and research into utilization has expanded even more rapidly. In all the Council spent £3,200,000 on research during the year.

## Electricity in England and Wales

*Reports of the Electricity Council and the Central Electricity Generating Board for the year 1968-69. H.M.S.O., £1 5s. 0d. and 12s. 6d. net respectively.*

The year under review is the 21st since the electricity industry was nationalized on 1 April 1948, and is also the 12th year of the existence of the Electricity Council which was established by the Electricity Act of 1957 to advise the Minister of Power on all matters affecting the industry and to assist the maintenance and development by the Central Electricity Generating Board and the Area Boards of an economical and efficient system of supply. The Council is called upon to present a consolidated account of the Council, the Generating Board and the Area Boards, and to exercise certain functions in respect of finance, research and industrial relations.

The report gives an interesting comparison between the statistics of the industry in 1948 and at the end of the year under review. Income has increased from £213 million (which included the South of Scotland) to £1,401 million, the units sold from 36,000 million KWh to eleven and a quarter million consumers to 160,269 million KWh to 18 million consumers, maximum output capacity from 10,660 to 44,673 MW. With these changes, the number of power stations has fallen from 291 to 201, overall thermal efficiency has increased from 21.22 to 28.26 per cent, works costs per unit sent out has increased from 0.4961d. to 0.6805d. and the average price per unit sold from 1.185d. to 1.914d. it is noteworthy that the works cost per KWh was less than the figure of 0.695d. for the previous year.

The balance of revenue for the year was £100.6 million, an increase of £45.6 million. Sales of electricity increased by 6.5 per cent to 160,269 million units: this includes off-peak sales increased by 1.832 million units, or 20.2 per cent. Sales of storage radiators by the Area Boards increased by 15 per cent.

The industry aims to secure the optimum use of plant by off-peak tariffs. At the end of the year the Area Boards introduced unrestricted day-night (White Meters) tariffs for domestic consumers, based on one rate for all electricity consumed at night regardless of the character of the equipment used.

The maximum demand met—without variation of frequency or voltage—was 37,738 MW at 1500 hours on Wednesday, 9 February, an increase of 5.4 per cent.

The capacity of power stations and of plant units continues to increase. The first two 2,000 MW stations, with 500 MW sites, are in commission.

The load factor of the system was 52.7 per cent. The average thermal efficiency of coal and oil-fired stations was 28.26 per cent. The highest thermal efficiency was 35.23 per cent at Ferry Bridge (C).

The distribution networks of the Board were extended and the number on consumers receiving current at single phase voltages outside the range 230-250 volts had been reduced to 229,487. The number of consumers still receiving direct current supplies is less than 400.

The total staff employed by the industry at the end of the year was 208,229 including 5,941 part time, 13,119 less than were employed at 31st March 1968.



## Generation

The main preoccupation of the Generating Board, hitherto, has been to ensure that supplies of electricity were available to meet the expanding demand, and that power cuts should not recur. To this end the Generating Board has taken considerable risks in installing large 500 MW, and later 600 MW sets, involving some delay in installation, but in the end increasing thermal efficiency and reducing the works cost of generation, which has fallen for the first time in the decade from 0.695d. to 0.6805d. per KWh.

New generating plants brought into commission during the year amounted to 3.540 MW sent out, the total output capacity at 31 March was 44.673 MW. The number of power stations was reduced from 216 to 210.

Bulk costs of electricity are accounted for by capital charges 39 per cent, fuel costs 41 per cent and staff costs 11 per cent.

The Board's stations burned 68.9 million tons of coal at an average calorific value of 10,559 Btu/lb notably from East Midland 19.5 million tons and Yorkshire 18.5 million tons.

Substantial savings in fuel costs could be secured by conversion of some coal-fired stations to oil or possibly natural gas: but at the present time, owing to the difficulties of the coal industry, such conversion would not generally be approved.

The total sales to Area Boards and other consumers amounted to 160,038 million KWh at an average price of 1.3230d. The Board's total income amounted to £942.9 million, expenditure on revenue account to £912.6 million leaving a balance of £30.3 million used to finance capital expenditure, which amounted to £212.7 million on power stations and £118 million on transmission.

The introduction of British Standard Time and the retention over the winter months, has altered the level and pattern of daily demands, which have been higher at morning peak and lower in the evening.

More than two million KWh were exported to France and total imports from France amounted to 762 million KWh. 2,044 million KWh were exported to Scotland, and nearly 56 million KWh were imported from Scotland.

*A. J. Cousin*

## The Industrial Fuel Efficiency Diary 1970

*Edited by H. G. Lock, published by H. O. Quin Ltd., 151 Fleet Street, London, E.C.4., 14s. postage 6d.*

This Diary, which we have not seen before, contains much basic, derived and related data for engineers, fuel technologists and all concerned with fuel, combustion, steam and power. In addition to the usual calendars and information contained in most diaries, this diary contains 132 pages of matter and tables relating to combustion, fuels and measurements. There is a mass of useful information for any fuel technologist or combustion engineer. Useful additions are tables of metrication and SI unit conversions. As well as the usual space for memoranda, the diary contains a few pages of graph paper, always useful for the engineer. The diary measures  $5\frac{1}{2} \times 3\frac{3}{8} \times \frac{3}{8}$  inches and fits conveniently into a waistcoat pocket.

## Environmental Health Report 1968

*Association of Public Health Inspectors, 5s. post free*

The fifth annual report produced by the Association of Public Health Inspectors on the environmental health of England and Wales was published on 6 October 1969, on the opening day of the A.P.H.I. annual conference in Eastbourne, when a special press conference was given by the General Council of the Association at which *Smokeless Air* was represented.

Mr. A. Archer in introducing the Report referred to the newly created Ministry of Local Government and Regional Planning and stressed the importance of treating the environment as a whole. This publication was the only source of *all* environmental health services and reflected the interest of the Association of Public Health Inspectors in the whole way of people's lives.

Summarizing the section of "Environmental Health 1968" concerned with clean air, Mr. Archer said that there was disappointment at the slow progress in reducing domestic pollution. It was a mistake to slow down smoke control programmes because of economic factors. The cost of pollution was ultimately greater and an appeal to local authorities should be made on this ground. Later, the point was made that in some smoke control areas a smoke reduction of 75 per cent had been observed. Regarding industrial pollution, there were still problems of grit and dust and sulphur dioxide. The ground level concentration of the latter had not increased, but it was a problem needing much study.

Under the heading "Clean Air", the Environmental Health Report reviews the progress made during the five years since it was published. Most progress has been made in London but only 20 per cent of the Black Area acreage in the Northern Region and 18 per cent in the East Midlands has been covered by smoke control areas. During 1968 the rate of progress in the declaration of smoke control areas showed a slight decrease. When the Beaver Committee published its report it estimated that domestic smoke could be abolished in the Black Areas in ten years: three years after this target, it is shown that only 38 per cent of premises are covered.

Referring to the Clean Air Act 1968 which amends and extends the powers on the original Act, the Report considers that so far as domestic matters are concerned, "the amendments are soundly based and are all of practical value".

### *Industrial Pollution*

It is interesting to learn from the Report that 1,986 contraventions of the dark smoke provisions of the Clean Air Act 1956 were recorded during the year and that legal proceedings were taken in only 31 cases, of which all but four were successful. The Report reviews briefly how the various industrial provisions of the Clean Air Act have been administered in practice by local authorities and quotes relevant figures and statistics which are of considerable interest. On fuel, the Report states that as in the domestic market, so for industrial and commercial applications, solid fuel is losing ground to oil, gas and electricity. There is now a definite trend towards the use of gas oil with a sulphur content below 1 per cent, away from residual fuel oils with much higher sulphur contents.



The Report concludes that generally it would be fair to industry to recognize that they have done a great deal to reduce air pollution over the past decade, "far more in fact than they are often given credit for by the general public". There are still many problems to be solved and a lot can be done if the planning officer and public health inspector co-operate fully when new industries are being set up or extensions of existing ones are being planned. Many of today's complaints arise because of bad planning in past years.

### **The Boiler Operators Handbook**

*National Industrial Fuel Efficiency Service, 124 pages, N.I.F.E.S. 10s. post free.*

This book replaces the New Stokers Manual, which was first published by the National Industrial Fuel Efficiency Service in 1959.

In view of the many changes that have taken place during the last decade, an entirely new and up-to-date version of the book, with additional material, has been prepared and the subject matter grouped in a more logical sequence. The Boiler Operators Handbook is intended to help the boiler operator to carry out his important work with skill and efficiency. It is not a text book, but it contains sufficient information to encourage the operator to study the subject more extensively and obtain a recognized qualification.

Although Great Britain will shortly introduce the international System of Units (S.I.) to replace the system of Imperial Measurements, the precise usage has yet to be determined. Consequently, the old style and familiar measurements have been used in the Handbook and a leaflet giving the metric equivalents will eventually be issued with it.

Copies may be obtained direct from N.I.F.E.S.

### **Dictionary of Fuel Technology, Alan Gilpin**

*275 pages, Newnes-Butterworths, 42s.*

After many years in Technology, both as an amateur and as a professional, one can at times be excused for stopping to think where a certain piece of information can be found, it having left one's head temporarily. The experienced engineer is the one who immediately can find such information by deft manoeuvres of his bookshelf, the newcomer to the profession may get frustrated either by the incompleteness of his bookshelf or being unable to separate the wood from the trees.

Alan Gilpin's book—"Dictionary of Fuel Technology"—not only bridges the gap between the newcomer and the old stager, but provides a most comprehensive compendium of references for the reader who merely wishes to seek definition of a term from time to time.

From the Advanced Gas-Cooled Reactor back in time to Hills' Law, I found the book clear and concise. I note that the old "uncorrected" Siegert Formula has been correctly quoted, but I would like to have seen the inclusion of the modifications which have been made to this well tried old yardstick to allow "wet gas" losses to be assessed and Efficiencies to be quoted on the basis of Gross C.V. if required for comparison purposes.

I am pleased to see the "Sankey Diagram" included and explained, but equally sorry to see no mention of "Gauge Glass Drill" which is so often the cause of failure not only in practical examinations but of a boiler plant itself. The fact that no mention is made of the "Engine Indicator Diagram" is, in my view, unfortunate if only to the Industrial Antiquarian.

The arrangement of the book allows easy reference and cross reference and the drawings and typescript are clear, but with thirteen other similar reference books in their stable the publishers can be expected to produce a workmanlike job.

My reading of the book was disturbed to the point of irritation by the unnecessary use of the abbreviation "q.v." which, to my amazement, was not even included in the list of abbreviations.

Is there any significance in the fact that the author is an economist by original training, since when he has embraced the profession of Fuel Technology and now has provided a compendium which is an ideal *aide memoire* for the use of engineers who find that, as they grow older, they, by force of circumstance, are tending to become concerned more with economic problems than with pure technology? Clearly then, here we have a book which will be of value at some stage in the career of the engineer, the economist, and—dare it be said—the accountant.

At this time when the change from British units to the International System of Units (SI) is imminent, I suppose that a contemporary technical writing is liable to be somewhat confusing to the reader, but in deciding to provide conversion facilities in an index I feel the author has steered a safe course.

I consider that this book puts information into the hand of the reader which hitherto has necessitated a bookshelf for its storage. So many people today are concerned with the economic evaluation of their energy problems that any contribution to penetrate the fog of mysticism which surrounds the subject is welcome. I am sure that the student will cut corners by its use and the old practitioner will have his memory jogged.

H. Brown

### **Small Bore Heating and Hot Water Supplies for Small Dwellings**

*J. J. Barton, 104 pages, Newnes-Butterworths, 12s.*

This slim volume is a companion to Mr. Barton's book on estimating heat requirements which was reviewed in our last issue. The book deals with the design and practice of combined small bore heating and hot water supply for small dwellings. It covers the estimation of heat losses, piping layout, radiator sizing, selection layout and installation, pump sizing and methods of installation amongst other points. Tables are included to enable estimates to be prepared quickly and easily.

The book is well indexed and although primarily intended as a practical manual for all concerned with domestic central heating and hot water supply, the book will be of value to many others including students of domestic architecture.



### **\*Air Pollution Control**

*Clark C. Havighurst, Editor. Oceana Publications, Inc. Dobbs Ferry, New York, 1969. Price \$7.50*

“Air Pollution Control”, edited by Clark C. Havighurst\* is a new symposium dealing with many aspects of the problem as they relate to the American scene. Each of the twelve contributors has come to significant conclusions and it is interesting to read in one of them, “A Guide to the Air Quality Act of 1967”, that public concern about air pollution and the present vacuum of information on the health, technology and economic aspects of pollution control, have given rise to hasty ill-conceived regulatory proposals at state and local levels, occasionally with support at some levels in the Department of Health, Education and Welfare. At least no realistic appraisal of the British scene could include such a charge!

The book fails to devote space to the fundamental task of keeping the public informed about the basic facts of air pollution, ensuring that public opinion contributes to true progress in achieving the air quality a modern community requires. However, this may not have been within the scope or intention of the editor, oppressed by the knowledge that 183,000,000 tons of toxic matter are being poured into the U.S. atmosphere every year.

The deficiencies in the Air Quality Act are frankly and honestly stated. The fact that the book states “the Air Quality Act of 1967 is not the strong decisive instrument needed to bring about an immediate, significant reduction in air pollution levels”, is a pointer to its timeliness and value. This book will be a valuable piece of armour in the hands of such movements as “Citizens for Clean Air” and “Action for Clean Air” who, in their efforts to bring about a speedier improvement in the nation’s air quality need to be particularly careful over the basic information they use for campaigning.

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### **TRAINING AND LUBRICATION**

The Imperial College of Science and Technology announce that they will be holding a series of one-week courses on lubrication during the coming winter. Courses will be held in the weeks commencing:

19 January, 1970  
2 February, 1970  
16 February, 1970  
2 March, 1970  
16 March, 1970  
20 April, 1970  
4 May, 1970.

The cost of the course is 45 guineas inclusive. Further details can be obtained from Mr. A. Cameron, Reader in Mechanical Engineering, The Imperial College of Science and Technology, Department of Mechanical Engineering, City and Guilds College, Exhibition Road, London S.W.7.

# INTERNATIONAL NEWS

## **United Nations Conference on Human Environment— Stockholm, June 1972**

In furtherance of a resolution adopted on 3 December 1968, the General Assembly of the United Nations has decided to convene in 1972 a United Nations Conference on Human Environment. The Secretary-General had also been requested to submit a report and this was issued this year under the title "Problems of the Human Environment", and was made available to all member Governments of the U.N.

The decision to convene the Conference, which is planned to be held for two weeks in Stockholm in June 1972, reflects a growing world-wide concern with the degradation of the biosphere and the increasing pressure of world population upon land and other limited natural resources. The heavy impacts of science and technology bring with them the threatening consequence of air and water, pollution, the problem of solid waste disposal, of chemical, pesticides, and noise among others. The international aspects of these problems have until the convening of this Conference received little attention, especially as they relate to developing countries.

The United Nations Committee on Housing, Building and Planning has been advised that the Conference is likely to make important recommendations for action on environmental problems by the United Nations and other international agencies as well as to provide guidelines for meeting the urbanization problems.

Since cities are regarded as sources of pollution and have other major impacts on the environment, there will be a detailed consideration of the problems of immediate and long-range importance to those concerned with all aspects of the physical city, its growth and development.

### **U.S.A.**

#### **Reducing Smoke from Jet Aircraft**

Last August Commissioner John T. Middleton of the National Air Pollution Control Administration (N.A.P.A.C.A.) announced that he was inviting airline operators and engine manufacturers to a meeting to discuss an accelerated schedule of voluntary installation of improved devices for reducing smoke trails from jet aircraft. It was then pointed out that Pratt & Whitney had already developed a smokeless combustor for its JT8D engine. The meeting was to discuss how promptly various types of jet engines could be modified and also the development of new engines with the smoke-reducing characteristics built in.



Surprisingly enough, but for a different reason, some action in this field has come much sooner than might have been expected. An Associated Press report dated 13 October 1969, states that seven major airlines in the U.S.A. have announced that effective immediately, all new planes will contain smokeless engines that will not pollute the air. The announcement came during a hearing on a suit by the New Jersey State Department of Health which charged the airlines with violation of the state's air pollution code. The airlines, which were cited as being "very co-operative" were Trans World, Northeast, Piedmont, Eastern, National, American and United. Since the filing the suit two months ago, the seven airlines also agreed to convert a total of 45 engines per month to the smokeless variety, effective February 1970, and to increase the refitting to 200 per month, effective from 1 August 1970.

## WEST GERMANY

### Reinhaltung der Luft

The Congress and Exhibition held in the Messegelände at Dusseldorf, from 13-17 October 1969, was an important clean air occasion. International in character it attracted 1,700 delegates from Austrailia, Brazil, Belgium, Bulgaria, Czechoslovakia, East Germany, France, Finland, Great Britain, Holland, Hungary, Italy, Yugoslavia, Norway, Spain and the United States as well as the host country, the Federal Republic of Germany. Papers from Britain were given by the Chief Alkali Inspector, Mr. Frank Ireland, "The Determination of Chimney Heights"; by Mr. J. Parker of Warren Spring Laboratory, "The Automation of Air Pollution Surveys" and by Mr. A. Archer, Chief Public Health Inspector, Halesowen, "The Administrative and Technical Approach to Air Pollution in the United Kingdom".

The President of the Society, Sir Kenneth Hutchison, C.B.E., F.R.S., The Director, Rear Admiral P. G. Sharp, C.B., D.S.C., and the Assistant Secretary, Mr. A. A. Mister 'attended as delegates. Other British delegates included the Chairman of the Association of Public Health Inspectors, Mr .W. Parker and the Secretary, Mr. R. Johnson.

A major contribution from this country was the Joint Venture Stand which the Society had organized jointly with the Board of Trade and the Central Office of Information. Occupying a prominent position in Hall B, the stand had as it s centre piece an information and lounge area manned by the Society's team consisting of Rear Admiral P. G. Sharp, Mr. Alan A. Mister, Mr. Hughes and Mrs. V. Finlay. Containing both telex and telephone, this area also served as the focal point of the stand and provided desk accommodation for the British Consulate in Dusseldorf whose officers gave assistance with trade inquiries and commercial liason.

The decor for the information stand was the story of clean air progress in Britain. Four display murals were used for this purpose, giving the significant dates in British clean air progress, the achievements both in the industrial and domestic field and details of problems yet to be fully resolved. A stand brochure was widely distributed and gave full information regarding the Society's role in Britain and the other exhibitors on the stand.

The Ministry of Technology showed work being done at Warren Spring Laboratory and the Atomic Energy Research Establishment, Harwell. Their exhibits emphasized the continuing investigation and development of methods and instruments for the measurement of air pollution, the possibilities of automating measurement and survey to achieve economy in man-power and the production of adequate instrumentation to measure levels of pollution. Instruments showed included a personal Air Sampler, a size selective dust sampler, an integrating nephelometer and a continuous tape air sampler.

Also emphasizing the important role of instrumentation were the exhibits of Fleming Instruments Ltd., of Stevenage. These included a particle size micrometer and analyzer, a particle sampling unit, air pollution monitors and an aerosol spectrometer.

Another instrument company, Airflow Developments Ltd., of High Wycombe showed a range of dust and smoke monitoring equipment. This range, surely the most comprehensive of its type in the world, included the S.E.R.O.P., optical smoke and dust monitor produced in co-operation with the C.E.G.B., the Airflow B.C.U.R.A., dust sampling equipment and a full range of air velocity and pressure measuring instruments.

The stand of F. E. Beaumont Ltd., London, S.W.9 was highlighted by a Beauvent steel chimney 8 metres high and 0.5 metres in diameter. In fact it was the focal point for the Joint Venture Stand, rising quite majestically, above the other stands in the hall. A working model showed the erection in one piece of a 41 metre Beauvent steel chimney. Other models showed chimneys designed as architectural features and to contain multiple inner flues, cold water and fuel storage in a single unit.

Centri-Spray of Croydon featured some of their more recent achievements such as the Cupola Gas Cleaning Plant installed at the Ford Motor Co., Thames Foundry (described on page 277 of *Smokeless Air* No. 146, Summer 1968). Other panel displays showed the air washer systems designed to cover requirements from 2000 CFM and 1,000,000 CFM and including the 316L stainless steel washer to operate in toxic and corrosive atmospheres.

The versatility and compactness of Dust Control Equipment Ltd., Leicester, products is a byword in the field. Their display included the New Dalamatic DLM/SVF Venting Filter with fan, the Auto-Drytex ADT/12 Unit Dust Collector, the Minimaster MM20 unit dust collector and the Unimaster UMA 102 unit dust collector. Together, these products demonstrated the ability of Dust Control Equipment Ltd., to handle practically every type of dust problem in a wide variety of industries.

Lodge-Cottrell Ltd., of London, W.1 are deservedly well-known for their world-wide comprehensive gas cleaning consultancy service to industry. Their stand sought to explain how they and Buell Ltd., solve individual gas cleaning problems by means of working and scale models, actual equipment and photographs and drawings. A scale model of a power station precipitator for the collection of dust from oil and coal fired flue gases aroused considerable interest.

Polar Chemicals Ltd., of London, S.W.1 showed a new chemical treatment for removing combustion deposits in boiler and furnace installations. This treatment is claimed to achieve a positive reduction in air pollution because deposits





Dusseldorf. The Society's part of the Joint Venture Stand at the International Exhibition

in boiler systems can be reduced by up to 75 per cent and in many cases soot-blowing can be eliminated.

Visitors to the Thermotank Ltd., Glasgow, stand were able to look at models of the world's first free standing, self-supporting, four-way split Dribore chimney as erected at the British Tissues (Bridgend) plant. This chimney is 27.5 metres high 1.5 metres in diameter. The function and purpose of a complex modern chimney was fully explained on the stand.

Universal Machinery & Services Ltd., Leeds, had a working model of their sealed flame incinerator operating on an outside site. This incinerator, designed to be free standing, does not require a water trough or precipitator in the exhaust chamber, incorporating as it does a curved hearth and venturi filter in the combustion chamber and a second expansion after-burner section. At the stand, Universal Machinery were able to give information regarding larger municipal/industrial incinerators which will accept crude refuse and be used in large multiples.

Interest in all products on display was shown by the many visitors to the stand. The President and Director of the Society called on all exhibitors and during the week, the British Consul in Dusseldorf, the Technical Adviser to the British



Consulate, Bonn, and many distinguished overseas visitors toured the Stand. Informal meetings were held with delegations from the Norwegian and Hungarian Governments, the latter wishing to study all aspects of British clean air legislation. Distinguished visitors also included Arthur C. Stern of the U.S.A., Dipl.Ing. F. Oels of Dusseldorf, Mr. Frank Ireland, Herr H. Stephany, Director of VDI Reinhaltung der Luft, the organizers of the Congress and Exhibition, and many others eminent in their respective fields of air pollution control.

The Joint Venture Stand and the presence of the British delegation was of considerable value to the cause of clean air. The exhibits demonstrated the pre-eminence of this country in the field of achieving air pollution control, the Society's stand recorded the facts of this achievement and sold and gave away confirmatory literature. The delegation gave personal testimony both in the Congress Hall and the various receptions and social events to the means whereby progress had been made in Britain and the extent to which industry was prepared to meet the challenge of even higher standards of air quality in the future.

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### **District Heating Conference and Exhibition Bristol, 15-19 September**

The Society's decision to participate in this Conference and Exhibition was prompted by a variety of reasons, the principal ones being the long-standing association the Society has had with the campaign for the acceptance of District Heating, dating back to 1938 and the opportunity the exhibition presented for telling our story and thereby supporting the activity of the South West Division.

The Conference was restricted to 250 delegates, and in the course of two days 24 papers were presented. These dealt with the technical and legal problems involved, the planning aspects and the important role automatic controls, proper pipe installation and computer design can play in making schemes economically acceptable. A number of authors stressed the relationship between district heating and the reduction of atmospheric pollution. Mr. Alan Mister, the Assistant Secretary of the Society presented a paper on "Clean Air and District Heating" at the opening session.

Nineteen exhibition stands were laid out most attractively in a spacious hall linked to the Conference room by a lounge/administration area, manned by a staff of eight to ensure that both delegates and exhibitors received every attention.

The Society's Stand consisted of the new modular display illustrated on page 163 and was manned throughout the period of the exhibition by members of the South West Division. Unfortunately the interest shown at the opening was not maintained, but the Society's "flag was shown" and the large-scale distribution of the Society's publications, principally the 1969/70 Year Book, constituted a valuable contribution to the cause of Clean Air in the South West.



# DEATHS FROM BRONCHITIS

The Beaver Committee in its Final Report gave figures to show how the bronchitis death rate varied according to the size of the town, and how the urban rate was in excess of the rural rate. In the Spring 1968 issue of *Smokeless Air* we published the then up to date figures. We now append the figures from the General Register Office, Somerset House, for 1967. The figures show that the urban excess still prevails.

## England and Wales 1967

	<i>Males</i>	<i>Females</i>
Total deaths from bronchitis	20,487	7,324
Total deaths from all causes	277,178	265,338

Deaths according to type of area:			Standardized Mortality Ratios*	
	Total Deaths		Males	Females
	<i>Males</i>	<i>Females</i>		
Urban Conurbations	7,893	3,154	117	123
Urban areas outside the conurbations:				
Population 100,000 or over	2,910	1,001	115	108
Population 50,000 or over and under 100,000	1,979	703	101	95
Population under 50,000	4,359	1,386	94	83
Rural Districts	3,346	1,080	73	75

Regional Distribution of Bronchitis Deaths			Standardized* Mortality Ratios*	
	Total Deaths		Males	Females
	<i>Males</i>	<i>Females</i>		
Northern	1,430	493	103	110
Tyneside conurbation	428	171	123	145
Yorkshire and Humberside	2,318	876	116	125
West Yorkshire conurbation	880	349	122	127
Northwestern	3,718	1,536	134	150
S.E. Lancashire conurbation	1,449	712	148	193
Merseyside conurbation	692	256	138	130
East Midlands	1,405	469	102	102
West Midlands	2,040	725	108	112
West Midlands conurbation	1,095	414	125	132
East Anglia	449	148	59	59
South Eastern	6,523	2,378	89	86
Greater London	3,349	1,252	101	97
South Western	1,197	326	69	53
Wales I (South East)	1,100	264	132	99
Wales II (Remainder)	307	109	79	81

\* Death rate, adjusted according to sex/age distribution of the population of the area concerned, and expressed as a ratio to the corresponding rate for England and Wales (England and Wales equals 100).

# Symposium on Pollution from Road Vehicles held by the South East Division of the Society on 11 November 1969

At the meeting of the South East Division at Friends House, London, on 11 November, four speakers gave their points of view on the different aspects of the road vehicle pollution problem.

*Mr. J. W. Furness* (Superintending Engineer, Mechanical Engineering Division, Ministry of Transport) said that in view of the growing number of vehicles on our roads (14 million now and 20 million by 1980) we had to be alert where petrol engines were concerned to the dangers of the concentrations of carbon monoxide, hydrocarbons and nitrogen oxides present in narrow streets, where pedestrians were most likely to suffer. However, tests had shown that mean levels of carbon monoxide were lower than the maximum allowable concentrations in industry. The emission of hydrocarbons and carbon monoxide could be reduced by improved carburettors and by fuel injection, but both these methods were costly.

Regarding diesel engines on which 90 per cent of the 650,000 commercial vehicles operated, the Ministry of Transport enforced the regulations with approximately 2,500 prosecutions each year for emitting black smoke. Prohibitions resulting from roadside checks had been drastically reduced since the annual inspections at Ministry's testing stations were introduced in 1968.

Mr. Furness mentioned the British Standard for diesel engines and said that all but two engines in the U.K. conformed to this standard. Its effectiveness depended on the effort put into maintenance.

On the international scene, draft regulations were prepared for petrol engines and for crankcase control but they had to be ratified by the United Nations. As we had to compete in the world market with our cars, any increase in their prices would make us suffer and the Ministry for the moment could not find any good medical grounds why regulations should be made regarding emissions from petrol engines. They could not show benefits or assess amenity costs to justify such regulations.

*Mr. R. A. C. Fosberry* (Assistant Director, Motor Industry Research Association) spoke of the work going on in the industry on both the diesel and petrol engines. Where diesels were concerned, improvement in smoke measuring instruments would help in production line control, and the increasing use of turbo-chargers would reduce smoke.

As regarded petrol engines, the industry's knowledge of limiting emissions was a comparatively new subject, on which work started in the U.K. in 1961. In 1969, the motor industry was producing improved emission systems but they were only available for cars exported to the United States.



Mr. Fosberry stressed that the motor industry should be given a reasonable time of say two to three years—between the time of any emission regulations being made and coming into force. There was big capital expenditure involved for such items as the development of test facilities. Although the industry had a lot of know-how, there would always be the problems of maintaining the emission systems when in service and an increase in costs for the motorist was inevitable.

*Professor R. S. Scorer* (Professor of Theoretical Mechanics, Imperial College) commended in his talk the advantage of vehicle smoke being emitted higher than at breathing level. He thought that as domestic smoke was decreasing, the idea of vertical exhausts became more worthwhile. Professor Scorer called some legislation a piece of “legal engineering” which should be avoided as it could not be enforced. He suggested the issuing of “tickets” for black smoke. In towns, main arteries should not be too close and some spaces should be left without any traffic at all.

Professor Scorer insisted that taxis did make more smoke than other vehicles and wished to know whether there was a conspiracy of silence on that subject. Vehicle smoke was said to have no harmful effects on health (although certain other effects were reported) but we knew that smoke was objectionable and that was enough. It was a problem that the public would *require* to be removed and it was the biggest priority where pollution near the ground was concerned.

*Dr. W. C. Turner* (Associate Medical Officer of Health, L.B., of Tower Hamlets) surveyed in turn the effect on the human body of each major pollutant in vehicle exhausts, but emphasized that the overall levels of pollutants were the important factors. Dr. Turner mentioned hydrocarbons, carbon monoxide, carbon dioxide, sulphur, oxides of nitrogen, lead, carcinogens, rubber from tyre friction, asbestos for brake lining and aldehydes. In Dr. Turner’s opinion, not enough attention was being paid to carbon dioxide especially when power stations washed smoke and the plume descended to ground level. Up to 4 per cent carbon dioxide was possible down-wind from a power station. He also said that during the smog of 1952, the majority of 4,000 fatalities died of heart failure due to “overbreathing”.

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## **The Combustion Engineering Association Conference Brighton, 29-30 October 1969**

The theme of this Conference was legislation and the fuel user. The session of particular interest to the Society was that on the morning of the second day at which Mr. F. Reynolds of the City of Birmingham’s Public Health Department presented a paper on the Clean Air Acts 1956 and 1968. The session was chaired by Mr. R. G. Adams, Assistant Secretary, the Ministry of Housing and Local Government.

Mr. Reynolds produced a very comprehensive paper of some 53 pages in all, which sets out very clearly the provisions of the two Clean Air Acts. Unfortunately at the time of writing the paper, some of the exemptions issued by the Ministry of Housing and Local Government affecting those sections of the 1968 Act which came into force on 1 October had not been issued and so could not be included. However, Mr. Reynolds made reference to these exemptions in the course of presenting his paper, in which he discussed the provisions of the 1956 Act and how these were amended, strengthened, repealed or altered by the provisions of the 1968 Act. He said particular attention to the new provisions regarding chimney heights and those regarding grit and dust and their measurements.

The discussion was opened by Mr. Edgar Briggs of Shell and B.P. Ltd., who pointed out that the recent Clean Air Legislation had brought a revolution with complex changes for designers and the operators of combustion processes: the two Acts included a lot of regulations and circulars, in all over 50 which could be perplexing to the layman. He also thought that it was unfortunate that local authorities were inclined to use different forms of questionnaire when obtaining information from industrialists. Mr. Briggs thought that the grit and dust regulations were going to make big demands on industry and cause a large expenditure. Measurement also was an expensive business, for local authorities as well as large firms. It would be well to remember that the cost of measurement worked out at between £30 and £60 per man-day.

The discussion that followed showed that there was some confusion in the minds of combustion engineers regarding the exact application of legislation and some of the regulations. One complaint was that there was inconsistency among local authorities in the ways that the various rules and regulations were applied. Generally, however, there were fewer complaints about the legislation than might have been expected. The consensus of opinion seemed to be that provided the various regulations were applied more uniformly and that an approach similarly to that of the Alkali Inspectorate—"the best practicable means"—should be applied throughout the country.

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## LETTER

*The Editor,*  
*Smokeless Air.*  
Sir,

The Autumn number of *Smokeless Air* contains a paper by Dr. Hawthorne which was presented to the Scottish Division at Largs on 23 May last. This paper appears to be a well reasoned and factual account until the last paragraph when some inaccurate statistics have been employed.

In the first place there is an exaggerated fear of the effects of the sulphur oxides which could be tempered by reference to the Society's Technical booklet "Sulphur Dioxide: an examination of sulphur dioxide as an Air Pollutant". Second, the statement that "the combustion of one ton of fuel oil releases seven times as much sulphur dioxide into the air as one ton of coal" is not at all factual and should be examined in the light of the following.



There are several grades of fuel oils to be considered as well as several sources of coal. The sulphur contents of fuel oils may be taken approximately as:

	<i>Typical Sulphur percentage weight</i>
Light domestic fuel oil	0.08
Domestic fuel oil	0.6
Light fuel oil 200 secs.	2.3
Medium fuel oil 900 secs.	2.8
Heavy fuel oil 3,500 secs.	2.9
Power station fuel oil	3.1

Coals are more difficult to classify because they depend on source, but the average is about 1.6 per cent. There is a considerable spread of sulphur content of both types of fuels for large boiler usage; the range for oil is from about 2.3 per cent to 4 per cent by weight. Coals range from about 1 per cent to 6 per cent, but the above figures represent good averages.

It must be remembered that the calorific value of coals range from about 10,000 to 13,000 BTU/lb (average for large boilers 11,500) while oils range from about 18,600 to 19,900 BTU/lb (average for the largest boilers 18,600). In general oils can give a greater efficiency of steam generation than coal, although in power stations this difference is small.

If we disregard the domestic situation, in which oil firing produces only a minute fraction of sulphur oxides compared with that from coal, and examine the largest boiler situation using the cheapest oils and coals, and disregard the slightly higher efficiency of steam generation from oil, then a comparison based on equal thermal outputs may be made as follows:

$$\text{Oil equivalent of one ton of coal} = \frac{11,500}{18,600} = 0.62 \text{ tons of oil.}$$

$$\text{One ton of coal produces about } \frac{2240 \times 1.6 \times 2}{100} = 71.68 \text{ lbs. SO}_2.$$

$$0.62 \text{ tons of oil produces about } \frac{2240 \times 62 \times 3.1 \times 2}{100} = 86 \text{ lbs. SO}_2$$

However, it is generally considered that up to 10 per cent of the sulphur is retained in the ash when burning coal. Thus the above figure for coal of 71.68 lbs. may be reduced to 64.6 lbs. Thus the weight of SO<sub>2</sub> produced from oil by the

thermal equivalent of one ton of coal is  $\frac{86 \times 100}{64.6}$  which is 133 per cent or only one third greater.

Even if a comparison is made on a ton for ton basis, which is not scientifically accurate, then the heaviest fuel oil would produce about twice as much sulphur dioxide as coal.

It will be seen that the foregoing has been based on realistic figures and no attempt has been made to favour oil. Indeed, if the maximum sulphur contents

were considered in conjunction with the lowest calorific values for both fuels, a comparison would probably come out strongly in favour of oils. This would, however, only represent extreme conditions.

Yours faithfully,

PHILIP DRAPER

*Shipstal Cottage, Arne.*

## Air Pollution Abstracts

Abstracts of Papers Presented at N.S.C.A. Annual Conference, Eastbourne 1969

**1147. Presidential Address.** Hutchison, Sir Kenneth. The paper outlines the contribution that the gas industry has made to the cause of clean air and in particular stresses the importance of the discovery of North Sea gas. Soon the primary objective of clean air policy would be achieved almost by free choice with much less emphasis on legislation. In spite of the improvement of the atmosphere, during the last ten years in London, there were still many major problems to be overcome, some of them in the field of industry.

As far as industrial pollution was concerned, compromises were not unreasonable in an industrial nation which must produce and sell competitively. The author suggests that industry should be invited to take a more active part in assisting the National Society for Clean Air to draw up aims and objectives and asks whether industry as a whole could not draw up a declaration of intent.

**1148. Outstanding Air Pollution Problems in the Heavy Clay and Refractories Industries.** Rowden, E. Although the greater proportion of the products of the heavy clay and refractories industries are fired in continuous kilns practically smokelessly, it was recognized at the time the Clean Air Bill was passed, that certain firing processes would present difficulties with reference to complying with the Act and were therefore scheduled under the Alkali, etc., Works Regulation Act. The main problems of dark smoke emission occur with the firing by coal or oil of intermittent kilns and grate-fired continuous kilns, and with the firing of products which of

necessity must be fired in a reducing atmosphere such as, blue engineering bricks, roofing tiles and floor quarries. Other outstanding problems are concerned with fume emission and dispersal such as acid fume emission during the firing of salt-glazed pipes and fittings; fume emission during the firing of updraught kilns and clamps; emission of sulphur dioxide, fluorine and odorous fumes during the firing of Fletton bricks; acid soot emission from some oil-fired continuous kilns and acid mist emission when firing certain high-sulphur-content clays.

The methods being used to attack these outstanding problems are outlined, including that of dispersal by high chimneys. With the advent of natural gas, a clean sulphur-free fuel, the costly process of raising or replacing existing chimneys may not be necessary when firing certain products, but its availability at works and the economics of using it have yet to be fully explored.

**1149. The Pottery Industry's Contribution to Clean Air.** Holmes, W. H. An account is given of how the pottery industry has changed its firing practice from the traditional smoky, coal-fired bottle ovens to modern intermittent and tunnel kilns fired smokelessly by electricity, gas, fuel oil and liquefied petroleum gases. The changing pattern of fuel usage for purposes other than firing is also discussed, and again the trend is to replace coal by smokeless fuels. The striking improvement that these changes have helped to produce in the atmosphere of Stoke-on-Trent is presented pictorially and factually.



#### **1150. Air Pollution Control in Oil Refining.**

Sutton, P. Oil refining is a major industry in the United Kingdom; total throughput in 1968 was 81 million tons, processed in 22 refineries. Refineries are registered works under the Alkali Act, so responsibility for pollution control lies with the Alkali Inspectorate. At the same time, refineries take their social responsibilities seriously and make great efforts to minimize pollution for this reason.

An oil refinery is not just one works, it is a complex consisting of a number of different process plants together with storage and handling facilities for crude oil, oil products and gas. The effect of this complexity is discussed, together with the methods employed to control air pollution by smoke, dust, odour and sulphur dioxide.

Despite the highly competitive nature of the industry, there is contact between the refining companies to exchange information on pollution control. CONCAWE (the Oil Companies' International Study Group for Conservation of Clean Air and Water in Western Europe) was set up some years ago to assist in this co-operation.

#### **1151. Sulphur Oxides and Oil Fuels.**

Fuller, H. I. Whether the arguments for reducing the emissions of sulphur oxides from the combustion of oil fuels can be justified or not, only a limited number of techniques is available for achieving this reduction. They comprise: fuel oil desulphurization, combustion in chemically active beds, flue gas desulphurization, and dispersion of flue gases from tall chimneys.

The paper examines the status of these four approaches to the problem and discusses their applicability and limitations. It concludes that no one technique is universally applicable and that the fundamental problem is one of economics, which cannot be resolved by one industry on its own.

#### **1152. Clean Air and Health in London.**

Waller, R. E., Lawther, P. J. and Martin, A. E. During the past ten years there has been a substantial change in air pollution in London. Smoke concentrations have declined to less than one-fifth of their former values, and in recent winters there have been very few days of high pollution of any kind. Whilst it is difficult to assess the overall benefit to health, there is now less evidence than there was of any effect

of air pollution on daily deaths and hospital admissions in London, and the response of bronchitic patients to pollution is tending to decline too.

#### **1153. Dust Control in the Cement Industry.**

Burke, E. This paper starts with a brief description of the manufacture of Portland cement and the processes used to avoid a nuisance described.

The problems and difficulties encountered in making the equipment work efficiently are touched upon. Methods of dust measurement are briefly described and the implications of the Clean Air Act referred to.

The requirements of the Chief Alkali Inspector are outlined and some idea of the cost of dust removal touched upon.

#### **1154. Iron and Steel—Progress Towards Clean Air: (A) Review of Progress.**

Matthews, P. A. A brief general account is given of the progress made towards eliminating atmospheric pollution from the iron and steel industry. Improved fuel burning methods and the substantial replacement of coal by electricity or oil have largely eliminated black smoke emissions. The stage reached to date regarding the attainment of satisfactory cleaning of waste gases from the main iron and steel-making units is briefly reviewed with particular reference to the industry's most difficult problem, i.e. the containment of the fine red fume from oxygen steelmaking processes. Known capital costs of the order of £25 million have so far been incurred to comply with clean air requirements for scheduled processes only, and the relatively high cost of air pollution control in iron and steel manufacture is illustrated at the Spencer Works where the capital costs of anti-pollution measures amounted to 10 per cent of the gross costs of the corresponding process units. The British Steel Corporation's corporate plan of future development is briefly outlined with reference to clean air requirements.

#### **1155. Iron and Steel—Progress Towards Clean Air: (B) Some Practical Problems.**

Flux, J. H. The types and quantities of emission from various stages in iron and steel production are listed and illustrated by electron microscope photographs. Following a discussion on the principles affecting the selection of cleaning plant examples are given of practical installations for all the processes involved. Par-

ticular reference is made to electric arc and L.D. steelmaking as these processes not only present major problems in fume containment and cleaning but also will become the bulk steelmaking units of the future.

Considerable design and installation problems have had to be overcome but now most major iron and steelmaking units have been fitted with cleaning equipment which comply with the requirements of the Chief Alkali Inspector, which call

for cleaning efficiencies of the order of 99 per cent plus, and it is no mean achievement to maintain these on processes which are in continuous operation throughout the year and collect some 275,000 tons of fume and dust which otherwise would be discharged into the atmosphere. The industry claims a fair measure of success but it is not complacent and work is continually in hand to ensure that the required standard of efficiency is maintained.

## GENERAL ABSTRACTS

**1156. Tobacco, A Sensitive Monitor for Photochemical Air Pollution.** Heck, W. W. et al. (Nat. Air Poll. Contr. Admin. Publ. No. AP-55. U.S. Dept. of Health, Educ. & Welfare. June 1969. 1-21.) The development of a technique by which the sensitive tobacco variety, Bel W3 is used as a monitor for photochemical air pollution is discussed. The technique uses the plant as an indicator of the oxidant complex in both urban and rural areas. Two pilot studies that were conducted over a three year period during the development of the monitoring technique are included in the discussion. Attention is given to an explanation of the proper procedures for planting, transplanting, fertilizing, and caring for mature plants. The methods used in determining and recording injury to plant leaves is included; the studies showed almost daily injury to monitoring plants.

**1157. The Reduction of Smoke from Gas Turbine Engines.** Durrant T. (Aircraft Eng., July 1969. 27-32.) Exhaust smoke emission from high pressure ratio aero gas turbine engines currently in service has been reduced largely by attention to fuel air mixing in the combustion chamber.

It is demonstrated that aerated fuel sprays provide the additional control required as pressure ratios increase still further on new engines.

The proportion of produced carbon which can be burned in high temperature regions of the chamber will increase as both combustion maximum and turbine entry temperatures increase.

To provide a quantitative assessment of the degree of visual nuisance of smoke trails, prediction methods are being developed with the aid of data from research programmes.

**1158. The Chemical Composition on Atmospheric Aerosols on Tees-side and its Relation to Visibility.** Eggleton, A. E. J. (Atmos. Envir. 3. 1969. 355-372.) Approximately 100 high-volume filter samples collected in the Tees area during June to October, 1967, have been analysed for some 20 inorganic components. Ammonium and sulphate ions were major components of all the samples analysed comprising 65 per cent of the total soluble ion content and were present in proportions close to that of ammonium sulphate. The visibility recorded at one of the stations showed good correlation with the sulphate and ammonium ion concentration, less good with smoke and virtually no correlation with sodium ion. Although such a correlation does not necessarily imply a casual relationship between visibility and the concentrations of ammonium and sulphate ions, calculation shows that they account for a substantial portion of the loss of visibility.

Observations on a day of "a typical Tees-side Mist" showed very high levels of ammonium and sulphate of  $33 \text{ ug/m}^3$  and  $130 \text{ ug/m}^3$  respectively for a 24-hour sample and the concentrations during the mist period were probably more than twice as great as these figures. Results from the other stations indicated the presence of a strong source in the Tees area itself. Theoretical calculations indicate that most of the visibility loss on this day could be ascribed to the ammonium sulphate.

The ammonium sulphate is believed to arise from the oxidation of sulphur dioxide in the atmosphere in the presence of ammonia gas. Apart from industrial sources, ammonia may be given off from the soil by decay of nitrogenous material, from the combustion of coal or from un-



treated sewage. The levels of ammonium sulphate found on most days at Tees-side during the sampling period were not much different from those observed at AERE where there is no possibility of local industrial sources, so that non-industrial sources must also make a substantial contribution at Tees-side.

**1159. System for the prolonged exposure of small animals to automobile exhaust fumes.** (In French) Stupfel, M. and Godin, J. (Poll. Atmospherique, No. 43. July-Sept., 1969. 127-130.) The authors describe an installation allowing comparative study of the effect on rats, mice or rabbits of prolonged exposure to a dilution of exhaust fumes. The installation consists of two chambers, transparent and each divided into three compartments, one receiving pure air, the other the same air with the addition of an adjustable concentration of exhaust fumes, and of an automobile engine, some of the exhaust fumes of which are collected. The temperature,

hygrometry, barometric pressure, lighting and ventilation are constantly monitored inside the chambers, where the animals remain. Electric analysers measure the amount of carbon monoxide, carbonic-acid gas, hexane and oxygen, either at the engine outlet (before dilution), or in the exposure chambers (after dilution).

**1160. Investigation of the Dispersal of Smoke and Determination of the Height of a Chimney.** Vadot L. Belle, P. and Inard, A. (Poll. Atmospherique, No. 43. July-Sept., 1969. 131-142.) An investigation of the dispersal of smoke, using a scale model, has been carried out with a view to designing a collective heating system.

Risks of pollution have been examined within the individual context of the local climate, and also from the viewpoint of the effect on neighbouring buildings.

The results of this work have led to the adoption of certain characteristics for the evacuation of gases, and to the choice of BTS fuel for the most unfavourable cases.

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## NEW LIBRARY ACQUISITIONS

**62nd Annual Meeting, Air Pollution Control Association, New York, 22-26 June, 1969.**

The Society has received for its Library most of the 231 technical papers presented at the 1969 A.P.C.A. 1969 meeting. In view of their number, space prevents us listing all the titles and authors. However, members of the Society are welcome to borrow any of the papers in which they are interested. A Proceedings Digest consisting of abstracts of the papers and an author index, are also available.

**V.D.I. Clean Air Conference, Dusseldorf 14-16 October, 1969. Summaries of Papers.**

Selected summaries of the papers presented at the Dusseldorf clean air conference will be published in the next issue of *Smokeless Air*.

**U.S. Department of Health, Education and Welfare**

Four important documents published in January 1969 by the Public Health Service, National Air Pollution Control Administration, Washington, D.C., are now in the Society's library.

They are:

"Control Techniques for Sulfur Oxide Air Pollutants" (118 pp plus refs)

"Control Techniques for Particulate Air Pollutants" (183 pp plus refs)

"Air Quality Criteria for Particulate Matter" (189 pp plus refs)

"Air Quality Criteria for Sulfur Oxides" (162 pp plus refs)

# SMOKE CONTROL AREAS

## Progress Report

Position at 30 September, 1969—TOTALS

(Figures supplied by Ministry of Housing and Local Government)

	England	Wales	Scotland	Northern Ireland
<b>Smokeless Zones</b> (Local Acts) in Operation ..	44	—	1	—
<i>Acres</i> , 3,400				
<i>Premises</i> , 41,060				
<b>Smoke Control Areas</b> in Operation .. ..	2,915	6	128	14
<i>Acres</i> .. .. .	753,082	418	68,516	6,582
<i>Premises</i> .. .. .	3,932,969	2,352	319,350	7,048
<b>Smoke Control Orders</b> ..				
<i>Confirmed</i> .. .. .	177	1	7	10
<i>Submitted</i> .. .. .	63	—	5	3
<b>Grand Totals</b> ..	3,199	7	141	27

### Smoke Control Position in Regions of England at 30 September, 1969

(Figures supplied by Ministry of Housing and Local Government)

(1)  <i>Region</i>	(2) <i>No. of black area acres covered by smoke control orders con- firmed or awaiting decision</i>	(3) <i>Percentage* of total black area acreage in region so covered</i>	(4) <i>No. of black area premises covered by smoke control orders confirmed or awaiting decision</i>	(5) <i>Percentage* of total black area premises in the region</i>
Northern .. ..	31,630	25·24	145,274	26·27
Yorkshire and Humberside ..	170,124	45·18	566,281	48·49
East Midlands ..	55,920	20·84	165,510	32·34
Greater London ..	224,972	68·79	2,001,638	75·83
North Western ..	171,977	42·87	734,266	43·12
West Midlands ..	80,059	32·15	366,353	34·84
South Western ..	7,505	28·49	28,697	19·26
Total (black areas)	742,187	41·84	4,008,019	51·55
Outside black areas	134,523		440,866	
<b>GRAND TOTALS</b>	876,710		4,448,885	

\* The percentage shown in columns (3) and (5) above are percentages of the *total* acreage and not the *total* number of premises in the black areas concerned. In practice it may not always be necessary for the whole of the black area authority's district to be covered by smoke control orders (e.g., there may be some areas of open country).



# NEW SMOKE CONTROL ORDERS

*The lists below are supplementary to the information in the last issue of Smokeless Air (Autumn 1969) which gave the position up to 30 June, 1969. They now show changes and additions up to 30 September, 1969.*

*Some of the areas listed are new housing estates, or areas to be developed for housing. The total number of premises involved will therefore increase. An asterisk denotes that there have been objections and that a formal inquiry has been or will be held.*

*The list of new areas in operation of smoke control is based on the plans submitted to the Ministry of Housing but may erroneously include some local authorities who have made postponements, without notifying the Ministry of the fact.*

## ENGLAND

### NEW SMOKE CONTROL ORDERS IN OPERATION

#### Northern

##### *Tyneside and Wearside*

Gateshead C.B. No. 12. Tynemouth C.B. No. 8.

#### Yorkshire

##### *West Riding (North)*

Horbury U.D. No. 6. Horsforth U.D. No. 28. \*Rothwell U.D. No. 12.

##### *West Riding (South)*

Barnsley B. Nos. 4 and 8. Rotherham C.B. (Herringthorpe No. 5). Rotherham C.B. (Broom Lane No. 2).

#### North Western

##### *South Lancashire and North-East Cheshire*

Altrincham B. No. 7. Denton U.D. No. 10. Droylsden U.D. No. 13. Hyde B. No. 6. Leigh B. No. 8. Sale B. No. 9. Wigan C.B. No. 6.

##### *Central Lancashire*

Burnley B. No. 10. Nelson B. No. 4.

##### *Merseyside*

Liverpool C.B. No. 26. Widnes B. Nos. 8 and 9.

#### Midlands

##### *Derby, Nottingham and Chesterfield*

Dronfield U.D. No. 4. \*Hucknall U.D. No. 2. Sutton in Ashfield U.D. No. 4.

##### *West Midlands*

Birmingham C.B. No. 113. Sutton Coldfield B. No. 13. Walsall C.B. No. 13. Warley C.B. Nos. 1-7.

##### *Potteries*

Newcastle under Lyne B. No. 8.

#### London

##### *Greater London Boroughs*

Barnet L.B. No. 9. Brent L.B. No. 6. Ealing L.B. Nos. 40 and 41. Harrow L.B. No. 18. Merton L.B. No. 11.

##### *Local Authorities Outside the Black Areas*

Blaby R.D. No. 5. Canterbury C.B. No. 3. Canterbury C.B. (Folly Farm No. 2). Easthampstead R.D. No. 1. Glossop B. No. 3. Grantham B. Nos. 15 and 16. Lincoln C.B. No. 2. Ramsbottom U.D. No. 2. Reading C.B. No. 13. Stanley (Shield Row No. 1) U.D. (Durham). \*Tamworth B. No. 2. Todmorden B. No. 7.

### NEW SMOKE CONTROL ORDERS CONFIRMED BUT NOT YET IN OPERATION

#### Northern

##### *Tyneside and Wearside*

Gateshead C.B. No. 13.

##### *Teeside*

Darlington C.B. (Longfield Road, Branksome) Hartlepool C.B. No. 16.

#### Yorkshire

##### *West Riding (North)*

Baildon U.D. No. 11. Bradford C.B. (North West). Halifax C.B. No. 16. Horbury U.D. No. 7. Leeds C.B. No. 79. Morley B. Nos. 38 & 39.

##### *West Riding (South)*

Barnsley C.B. Nos. 10 & 11. Cudworth U.D. Nos. 1 & 2. Sheffield C.B. No. 17. Wath upon Dearne U.D. No. 4.

#### North Western

##### *South Lancashire and North-East Cheshire*

Altrincham B. No. 8. Blackrod U.D. No. 1. Bolton C.B. (Great Lever) Golborne U.D. No. 2. Irlam U.D. No. 4. Middleton B. No. 6. Sale B. No. 10. Salford C.B. No. 18. Stalybridge B. (Grey Street, Stocklane and Mottram Road). Wigan C.B. No. 7.

##### *Central Lancashire*

Accrington B. No. 9. Burnley C.B. No. 11. Darwen B. No. 5.

##### *Merseyside*

Bebington B. No. 20. (Stage 2). Birkenhead C.B. No. 10. Warrington C.B. No. 13.

#### Midlands

##### *Derby, Nottingham and Chesterfield*

Alfreton U.D. No. 3. Arnold U.D. No. 3. Dronfield U.D. No. 5.

##### *Potteries*

Kidsgrove U.D. No. 16.

#### London

##### *Greater London Boroughs*

Barnet L.B. No. 10. Croydon L.B. No. 11. Ealing L.B. No. 45. Enfield L.B. No. 17. Harrow L.B. No. 20. Lambeth L.B. No. 23. Merton L.B. Nos. 14 and 15. Westminster L.B. (Paddington Town).

Westminster L.B. (Paddington Church).  
Westminster L.B. (Hyde Park No. 2).  
*Outer London*

Dartford B. Nos. 8 and 9.

#### **Local Authorities Outside the Black Areas**

Belper R.D. No. 2. Castle Ward R.D.  
No. 1. \*Gillingham B. No. 5. Grantham  
B. No. 17. \*Rugby B. No. 10. Skipton  
U.D. No. 6. \*Skipton R.D. Sutton No. 1.  
Southampton C.B. No. 8.

### **NEW SMOKE CONTROL ORDERS SUBMITTED BUT NOT YET CONFIRMED**

#### **Northern**

##### *Tyneside and Wearside*

Newcastle upon Tyne C.B. No. 13.  
South Shields C.B. No. 4. Tynemouth  
C.B. Nos. 9 and 10.

##### *Tees-side*

Darlington C.B. No. 5. Hartlepool C.B.  
No. 17.

#### **Yorkshire**

##### *West Riding (North)*

Aireborough U.D. No. 26. Brighouse  
B. No. 15. Leeds C.B. No. 80. Sowerby  
Bridge U.D. No. 8.

##### *West Riding (South)*

Darton U.D. No. 13. Dearne U.D. No.  
6. Rotherham C.B. Richmond Park No. 1.  
Rotherham C.B. Broom Valley No. 1.  
Sheffield C.B. No. 21.

##### *East Riding*

Kingston upon Hull C.B. No. 11.  
(Bransholme).

#### **North Western**

##### *South Lancashire and North-East Cheshire*

Bolton C.B. (Moss House Farm).  
Bolton C.B. (Hillside). Crompton U.D.  
No. 5. Horwich U.D. Nos. 2 and 2A.  
Rochdale C.B. (Castleton and Meadway  
Corporation). Salford C.B. No. 22.

#### **Midlands**

##### *Derby, Nottingham and Chesterfield*

Chesterfield R.D. No. 12.

##### *West Midlands*

Aldridge-Brownhills U.D. No. 32.  
Birmingham C.B. No. 150. Halesowen B.  
No. 31. Sutton Coldfield B. Nos. 16 and 17.  
Warley C.B. No. 9.

#### **South West**

##### *Bristol*

Bristol C.B. No. 10.

#### **London**

##### *Greater London Boroughs*

Bexley L.B. No. 10. Ealing L.B. Nos.  
46 and 47. Kensington and Chelsea Royal  
L.B. (St. Charles and Golborne).

#### **Local Authorities Outside the Black Areas**

Glossop B. No. 4. (Pikes Lane). Hazel  
Grove & Bramhall U.D. No. 5. Hemel  
Hempstead B. (Adeyfield No. 1). Lincoln  
C.B. No. 3. Meriden R.D. No. 4. Rams-  
bottom U.D. No. 3. Rawtenstall B. No. 1.  
Shrewsbury B. (Sutton Area). South-  
ampton C.B. No. 9. Stanley (Durham)  
Tanfield Lea No. 1. Thurrock U.D. No. 7.  
Tadmorden B. No. 8. Whitley Bay B.  
No. 6.

#### **SCOTLAND**

### **NEW SMOKE CONTROL ORDERS IN OPERATION**

Coatbridge (Barrowfield). Fife County  
(Dalgety Bay) Hamilton (Fairhill/Laigh-  
tonstone Hall).

### **NEW SMOKE CONTROL ORDERS CONFORMED BUT NOT YET IN OPERATION**

Bishopbriggs No. 2 (Cleddens). Clyde-  
bank No. 7 (North and South Drumry).

### **NEW SMOKE CONTROL ORDERS SUBMITTED BUT NOT YET CONFIRMED**

Edinburgh (Murrayfield/Cramond No.  
3). Edinburgh (Pilton No. 1). Stirling  
County (Redding, Westquarter and Long-  
ton).

#### **NORTHERN IRELAND**

### **NEW SMOKE CONTROL ORDER IN OPERATION**

Castlereagh R.D. No. 3.

### **NEW SMOKE CONTROL ORDERS CONFIRMED BUT NOT YET IN OPERATION**

Coleraine R.D. No. 1. Hillsborough  
R.D. No. 2. Larne B.C. No. 1. Lurgan  
B.C. No. 2.

### **NEW SMOKE CONTROL ORDERS SUBMITTED BUT NOT YET CONFIRMED**

Armagh U.D. No. 1. Belfast C.B. No.  
7. Castlereagh R.D. No. 4.



# **Nottingham City Council saved £35,500 by installing the Baxi Fantom.**

## **What about your smokeless zone?**



The Fantom is the cheering, heart-warming answer to the cold facts of the Clean Air Act. Now, no one need give up a real living open fire even in a smokeless zone. The Fantom has been designed in conjunction with the National Coal Board.

The Fantom's secret is its built-in electric fan that streams air up through the fuel, noiselessly, continuously, and controllably. Switch on, and all smokeless fuels burn brightly, to give a glowing, living open fire.

They started installing 3,500 Fantom fires in the Bilborough, Beechdale, area of Nottingham early last year to be ready in time for the zone going smokeless in June, 1968.

Installation was completed three months ahead of schedule. Because of the fact that the Fantom is so easy to install—literally only 2 screws are needed—fitters were putting in 11 or 12 fires a day. So Nottingham City Council saved even more money in labour time. Nottingham isn't the only 'Fantom Town'. Many others are also installing Fantoms.

### **What a council gains: Nearly £10 on every appliance**

With an average installed cost of only £16.5.0. the Fantom is easily £10 cheaper than any other domestic appliance designed and guaranteed to burn smokeless fuels brightly.

May we give you a demonstration?

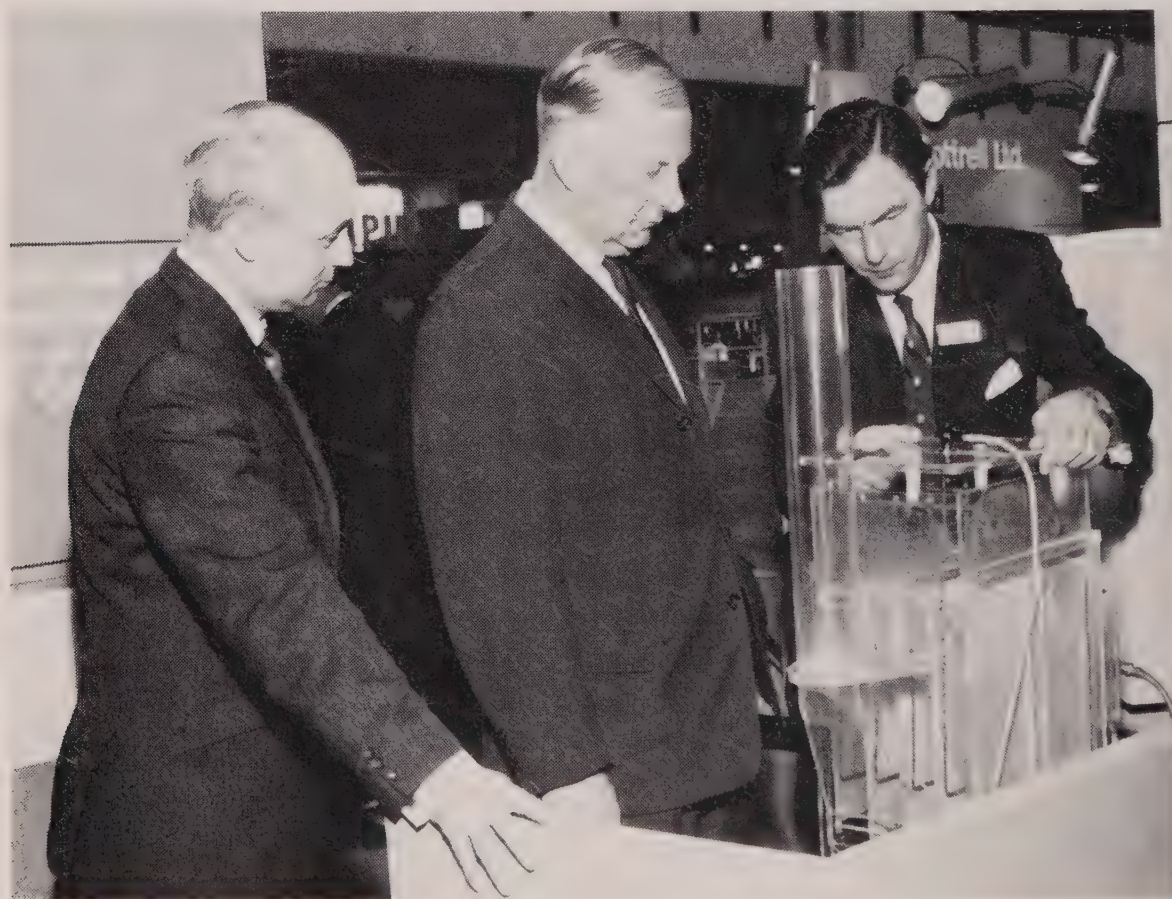
Please write to:  
Richard Baxendale & Sons Ltd.,  
Bamber Bridge, Preston, Lancs.  
PR5. 6SN (Dept. SA. 6)

**Baxi Fantom**  
**the power behind the living fire**





The Society's Stand at the Dust Control Exhibition at Olympia



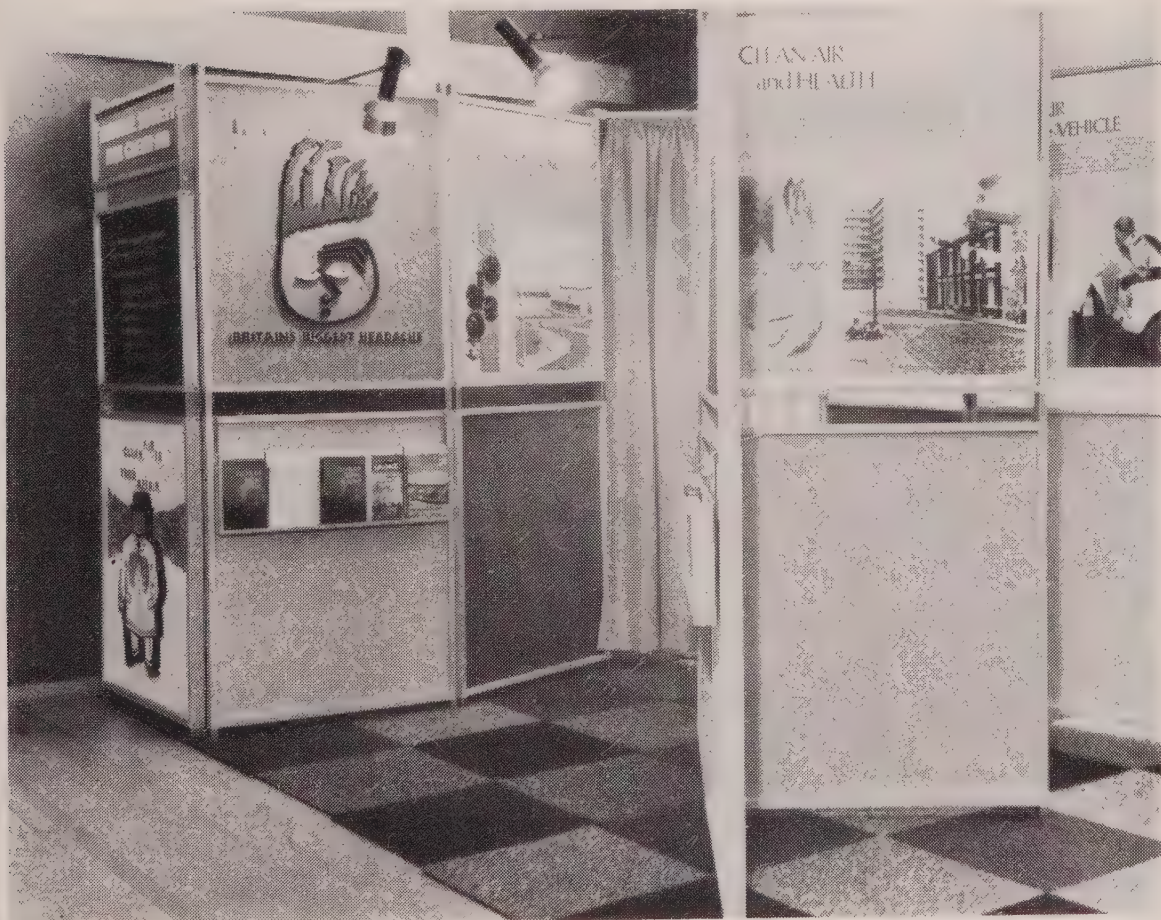
The Dust Control Exhibition at Olympia. The Director and Exhibition Officer with Mr. George Kinchett of Messrs. Lodge Cottrell Ltd.



## The Clean Air Exhibition, 1969

Instruments, gadgets, fluorescent tubes,  
Tables are mushrooms, chairs are cubes.  
Revolving stands for High Speed Gas,  
Leaflets, booklets by the mass.  
Glass Developments, bottles, wires,  
Wooden boards, Smokeless Fires.  
Chimney Lining diagrams,  
Reps with briefcase drawing plans.  
Cancer films to educate  
The smokers of the risk they take.  
Allied Ironfounders Stand,  
Business men glass in hand.  
Hot Air Dryers, very neat!  
Spotlight glaring, aching feet.  
Trees in pots bravely sprout  
Overfed on coffee grout.  
Artificial flowers adorn  
Desks of literature forlorn.  
Everything for distribution  
Means Clean Air, Prevent Pollution.

*Gabrielle Drewett*



The Society's Stand at the District Heating Exhibition at Bristol

# **SMOKELESS INCINERATORS**

*for*

Trade Refuse, Industrial Refuse  
Chemical Wastes, Old Cars, Old Furniture  
Scrap Cable, Municipal Refuse

## **FUME DESTRUCTORS**

## **GAS WASHERS**

CONSULT

**THE INCINERATOR COMPANY LTD.**

**14 COOPERS ROW, TOWER HILL, LONDON, E.C.3.**

**TELEPHONE 01-709 9931**



# INDUSTRIAL COLUMN

## *PEOPLE IN THE NEWS*

### **Sales Manager Appointed**

Mr. Aubrey R. Richings has been appointed Sales Manager of Kent Instruments (Stroud) Ltd. Following this appointment, the customer liaison and selling functions of the Veriflux and Pottermeter Divisions of the Company have been integrated at the Company's offices in Stroud.

### **New Director for Watson House**

Mr. Clifford H. Purkis has been appointed Director of Watson House, the Gas Council's research station at Fulham, in succession to Mr. Leslie W. Andrew, when he retired on 23 November, this year. Mr. Andrew was appointed Director in 1954.

The station, which has a budget of about £1 million a year, announced re-organization plans earlier this year to ensure that the gas industry keeps pace with the dramatic changes and expansion taking place.

Commenting on his appointment, Mr. Purkis said: "This is the most interesting time in the history of Watson House. As the gas industry advances at an unprecedented rate, the research and development work it undertakes must enable it to move quickly to take advantage of its extensive new opportunities."

### **New Appointment at McFarlane-Walls**

Mr. Peter Yates has recently been appointed Sales Director of the Supafu Division of McFarlane-Walls Ltd., Kingston-upon-Thames, Surrey. Mr. Yates was previously with B.S.A. Harford Pump Co. and prior to this with Henry Wilson Ltd. of Liverpool.

### **New President for Hevac Association**

Mr. A. G. Ludgater, Director and Commercial Manager of Thomas Potterton Ltd., has been appointed President of the Heating Ventilating and Air Conditioning Association.

The Association looks after the interests of a £400 million-a-year industry which has a growth rate approaching ten per cent a year.

Mr. Ludgater is a man of many parts. He has been in engineering for more than 30 years and his hobby is working as a silversmith. One of the few private enthusiasts to be granted by the Goldsmith's Company his own private hallmark, he has just finished a pair of silver goblets. His secondary hobby is cruising on the Thames.

### **New Manager at Vokes Ltd.**

Vokes Limited, the filtration engineers based at Henley Park, Guildford, Surrey, have appointed Mr. Derek Darkins to Manager of the Air Filter Division. Mr. Darkins is also a director of Vokes-Cardwell Ltd. and for many years has been involved in tobacco processing plant including dust extraction.

### **Board Changes and Appointments at the Incinerator Company**

The Incinerator Co. of Tower Hill, London have announced that Mr. S. K. W. Dunn has been appointed Managing Director of the Company and that Mr. C. J. Gunning, Mr. A. G. Tomkins, and Mr. A. J. Wootton, have been appointed Directors.

### **Stone-Platt Crawley Ltd.—**

#### **Appointment**

Stone-Platt Crawley Ltd. have appointed Mr. John Stephens, A.N.I.S.E., Sales Manager, Stone-Vapor Marine Boilers. His office is at 25 St. James's Street, London S.W.1.

#### **New Appointments at N.C.B.**

The National Coal Board have appointed Mr. W. M. Crooks, their Director-General of Purchasing and Stores, to be Regional Chairman for the coalfields of Scotland, Northumberland and Co. Durham. He will be succeeded as Director-General of Purchasing and Stores by Mr. C. L. Templeman, at present Principal of the Board's Staff College.

Mr. Crooks is taking over the responsibilities formerly held in Scotland

by Mr. R. W. Parker, and in Northumberland and Co. Durham by Dr. William Reid, whose retirement was reported in our previous issue.

#### **New Managing Director of Associated Heat Services Ltd.**

Mr. B. Chad Smith, Deputy Director-General (Commercial), Marketing Department, National Coal Board, has been appointed Managing Director of Associated Heat Services Ltd. in succession to Mr. R. G. C. Cowe, who has resigned for health reasons, and will return to the N.C.B.'s service in another capacity.

Associated Heat Services Ltd. was formed in 1966 to promote and operate district heating schemes and to provide a general heat service.

## **COMPANY BRIEFS**

### **A complete Gas-Cleaning Consultancy Service**

A brochure recently published by Lodge-Cottrell Ltd. describes the full range of the services available to local authorities and industries in dealing with industrial gas cleaning problems. With the addition of the specialized experience of their subsidiary company Buell Ltd., in the field of mechanical dust collectors, the two companies now have available a unique concentration of gas cleaning and dust handling knowledge. Lodge-Cottrell and Buell jointly offer a comprehensive consultancy service which includes gas testing, site investigation, definition of the problem and a complete design, contracting and commissioning service. Dust and fume control systems are designed as part of a customer's process, a technique ensuring that the equipment is the best possible for the particular application.

### **£25,000 Dust Control Contract**

Parkinson Cowan Appliances of Birmingham, have placed an order worth £25,000 with Dust Control Equipment Ltd. of Leicester, for a DCE Drytube 9000 dust filter.

The filter, which can handle 63,000 cubic feet of polluted air per minute, will collect vitreous enamel overspray from 17 booths.

### **Incineration of Organic Solvent Effluent Vapours**

A Report by the Technical Engineering Staff of Nu-way Eclipse Ltd., concerning the direct flame incineration of organic solvent effluent vapours has just been published. It emphasizes the problems that will be presented to industry with major effluent treatment problems with the acceptance of the new Clean Air Act.



### **Fully Automatic Steam Raising Plant for Laurie Grove Baths, Lewisham**

Two 6145 Stone-Vapor boilers have replaced three Lancashire boilers which were installed at Laurie Grove Baths, Lewisham, 40 years ago, and later converted to oil firing. Lewisham Borough Council had found the old boilers uneconomical to run and combustion had been difficult to maintain in a clean state so that smutting had occurred.

In addition to providing hot water for the swimming pools, slipper baths and establishment laundry, an efficient and abundant steam supply has been met for the space heating of the annexe offices and Deptford Town Hall.

### **Anglo-Soviet Working Party on Air Pollution**

From 28 October until 11 November, Soviet members of the Anglo-Soviet Working Group on Atmospheric Pollution were in this country to study industrial and automotive pollution.

The Russian delegation was divided into two groups; those interested in air pollution from industrial plant and those interested in air pollution caused by exhaust fumes from automobiles.

Both groups visited major industrial and research sites throughout the country and the visit was organized by Simon Engineering Ltd., Stockport, whose chairman, Sir David Barritt, was chairman of the British working party. The National Society for Clean Air was represented on the British working party by Mr. Alan Mister, the Assistant Secretary of the Society.

### **Whatman Filter Papers**

A new leaflet has been published describing the latest developments with Whatman Filter Papers which have been used successfully for many years in dust sampling procedures in

relation to public health, industrial health, etc., for monitoring radioactive dusts, and inflammable or explosive dusts, for smoke testing in chimneys and exhausts, and for monitoring the dust content of industrial gases; for the collection and investigation of oil mists, and for investigations on smokes and airborne micro-organisms.

The information presented in this leaflet will assist workers in the field of dust sampling and gas analysis to make the best choice of paper, and having made this choice, to use the paper under the best conditions for obtaining optimum performance.

### **Re-organization with the Hall-Thermotank Group**

It has recently been announced that as part of the internal re-organization, the business and activities of Thermotank Ltd., J. & E. Hall Ltd., and Searle Manufacturing Co. Ltd., all wholly-owned subsidiaries of Hall-Thermotank Ltd., should be combined within a single operating company with effect from 1 October. J. & E. Hall Ltd. has been chosen as the most convenient vehicle for these arrangements and has accordingly changed its name to Hall-Thermotank International Ltd. (HTI Ltd.).

### **Improved Home Heating at Stevenage**

Recently, Lord Robens, Chairman of the National Coal Board, visited Stevenage, Herts., to see the 200th solid fuel central heating system to be installed in Stevenage Development Corporation houses during the last two years.

Since the scheme was launched in September 1967 more than 85 per cent of those accepting central heating have chosen solid fuel installations.

### **Developments at Bekon-Bell**

Bekon-Bell Ltd., specialists in central heating, have formed a Contracts Engineers department at their new Slough headquarters. This new department will take complete responsibility for sales of the company's Uni-Belkon single tapping radiator system. Following the success of the single tapping system in Scandinavia, Bekon-Bell were quick to realize its potential by being the first to introduce the system to this country. The Uni-Belkon radiator is specially designed to meet the requirements of group and district heating schemes.

### **Laser Associates at Dusseldorf Air Pollution Conference**

A ten-minute film on the application of lasers to the study of air pollution problems was shown at the Air Pollution Conference, Dusseldorf 13-17 October. The film featured an advanced ruby laser system designed and manufactured by Britain's leading laser company, Laser Associates, of Slough, Bucks.

The film is now available in England to those interested.

**Approved Domestic Solid Fuel Appliances**, List No. 26 1969/70, the official list of all domestic solid fuel appliances approved up to 30 June, 1969, by the Domestic Solid Fuel Appliances Approval Council has been published jointly by the Coal Utilisation Council, and Solid Smokeless Fuels Federation.

### **New Gas Council List of Approved Catering Appliances**

The Gas Council has published a new list of catering appliances, tested and approved by their Watson House research station to British Standards.

The booklet replaces all previous catering approval lists and is revised annually.

Consumers investing in equipment which appears on the list need have no worries about the arrival of natural gas to their kitchens. All the appliances listed are suitable for conversion from town gas to natural gas.

## ***EQUIPMENT AND SERVICES***

### **An Industrial Air Pollution Problem**

An industrial air pollution problem which has long been a recognized health risk to factory workers, may now be within sight of solution as a result of a new development by a Midland Company.

A first product from a development company set up only in June this year, the 'Filtermist' is a new approach to the problem of oil mist created by high speed and high temperature operations in factories.

### **New All Stainless Steel Chimney**

Selkirk-Metalbestos Ltd. announce the introduction of their all stainless steel chimney known as MODEL SS.

To contractors, heating engineers and architects it offers maximum safety and venting efficiency with minimum use of space. To Selkirk-Metalbestos Ltd. it represents years of experimentation and research to produce the first all stainless steel chimney and maintains their position as world leaders in this field.





A Peabody Scrubber is manoeuvred into position at Bristol Docks

### **Peabody Scrubbers Put to Sea**

Two giant Peabody high efficiency gas scrubbers took to the water recently for delivery to English China Clays at Par in Cornwall. The scrubbers went by ship from Bristol to avoid congestion on the narrow Cornish Roads. Built for Peabody by Llewellyns & James Ltd. of Bristol, the scrubbers are to be installed at the English China Clays works in a determined effort to eliminate air pollution. Each 13-foot diameter scrubber deals with 50,000 c.f.m. of exhaust air from the works, discharging the clean processed air 150 feet above ground level. The two units will recover 130 tons of clay dust a week that would otherwise pollute the surrounding countryside.

### **Isles of Scilly R.D.C. overcome difficult refuse problem Sea-gulls create health hazard**

An American-designed portable incinerator, the first to be installed in England by a local authority, was commissioned in August on St. Mary's in the Isles of Scilly to avert a potential health hazard by sea-gulls scavenging refuse from tips and dropping over the town, sometimes into rain-water collection tanks. The incinerator manufactured by Brule Waste Control Ltd. of London, was chosen because it was easy to transport in four sections by road and sea, and because its size and complete absence of smoke make it inconspicuous—important factors on a small holiday island. It is situated only 200 yards from the Prime Minister's bungalow.



### **New Stainless Steel Linings to Combat Corrosion in 300-foot Power Station Stack**

Capper-Neill Industrial Products Ltd. is nearing completion of a contract from Head Wrightson Process Engineering Ltd. for the manufacture

and supply of stainless steel linings for the 300-foot-high multi-flue stack for the oil-fired boilers at the C.E.G.B.'s Bankside Power Station, London.



### **New Bag Filters**

Applications in Food and Chemical Processing plant, Cement Factories and General Engineering works.

New bag filters which incorporate unusual methods of filter cleaning and dust discharge have been developed by Stansted Filtration Ltd., Bishop's Stortford, Herts., for the filtration of dust, fumes and gases in chemical plants, cement factories, foundries, food processing plant and workshops where sanding, shot blasting and grinding are carried out. The filter sleeves are cleaned continuously by blasts of fan-driven air, instead of periodically by the conventional methods of electrically timed mechanical shaking equipment or compressed air. As a result, only 3 per cent to 4 per cent of filter area is off-stream for cleaning at any one time.

### **Ducted Central Heating for 14-Acre Local Authority Development**

786 of the dwellings on the London Borough of Hammersmith's impressive new Latimer Road South Development Scheme are being fitted with Ductair G 2300 ducted warm air gas central heating systems by Radiation Parkray Ltd. This extensive development, started in 1964, covers 14 acres of land, and comprises three 24-storey high-rise blocks and six five-storey low-rise blocks as well as eight shops, a doctor's surgery, two public houses and a public open space. The estate is scheduled for completion in 1971.

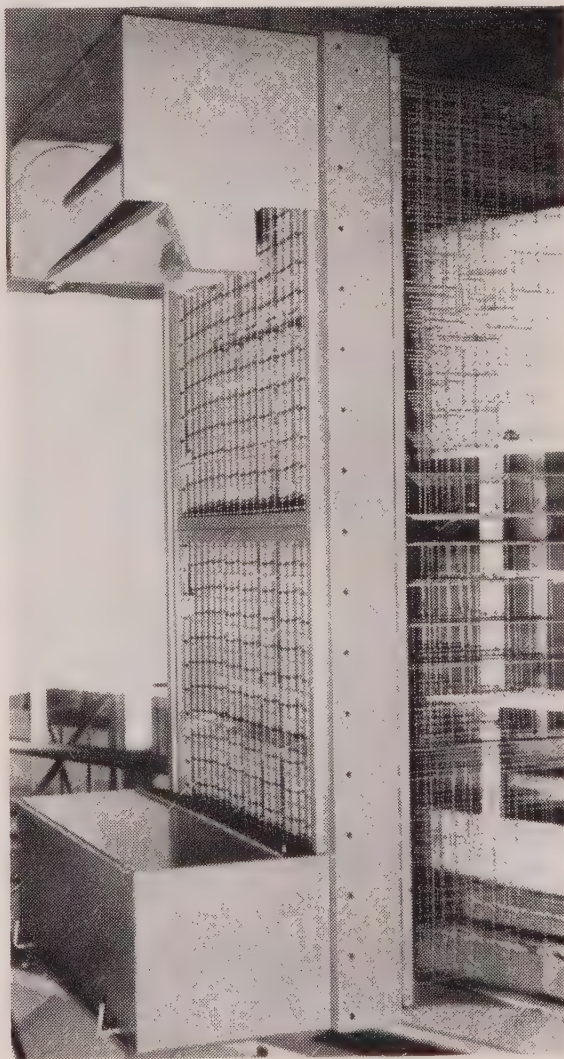
### **Redfyre's Pre-Launch Sales Success**

Redfyre Ltd. has won an order for 500 Plus-8 Roomheaters—weeks before the new appliance officially goes on the market. The order, worth more than £25,000, was placed by one of the largest central heating appliance distributors in the north of England.

### **Vokes New 'Autocell' Air Filter**

An addition to their range of Vee-Glass air conditioning filters, another called 'Autocell', is announced by Vokes Ltd., Henley Park, Guildford.

A unique product, Vee-Glass E.C.M.P. (electronically controlled media pattern), already successfully established in eight of the 16 types of air filter they market, can now be used in an automatic roll as a pre-filter to a bank of their Uni-Vee cells without the need for service hatches or connecting ducts.



The new "Autocell" Air Filter

### **Parkafloe: Long-Life Insulated Chimney**

A significant advance in the development of the factory-made chimney as an acceptable alternative to the traditional domestic flue, is the appearance of the Parkafloe.

Developed by the makers, Park Sectional Insulating Co. Ltd., of London, in co-operation with the National Coal Board, the Parkafloe has been specifically designed to conform with the requirements of the Building Regulations, and it is claimed to be the only chimney which meets the need of the construction industry for an insulated chimney of unitary construction having a rated life not less than that of the building in which it is installed.

### **Low-Priced Electric Smell Killer Opens Up a New Market**

The recent introduction of the Airbracer electric smell killer has enabled the manufacturers, O-Three Instruments Ltd., Weybridge, Surrey, to open up a completely new market in the field of small electrical appliances.

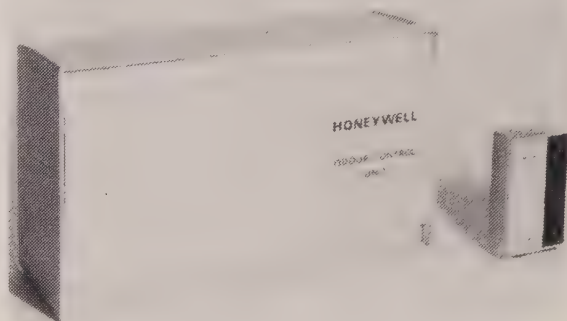
The Airbracer is an electrostatic smell killer/air purifier, capable of removing efficiently and silently all unpleasant household smells.



The Airbracer

### **Odour Control System for Commercial Applications**

Intended for small commercial or industrial applications, the new Odour Control System introduced by Honeywell's Residential Division, deals with disagreeable odours by evaporating a small amount of liquid counteractant into the air.



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### **£100,000 Order for Warm Air Heaters**

A.I.R. (Air Conditioning and Refrigeration) of Glasgow, has placed orders with William Sugg & Co. (Thorn Group) for Halcyon gas-fired domestic warm air heaters to the value of over £100,000. Air heaters will be installed in municipal housing developments in north-west England and Scotland.

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# **CLEAN AIR 70**

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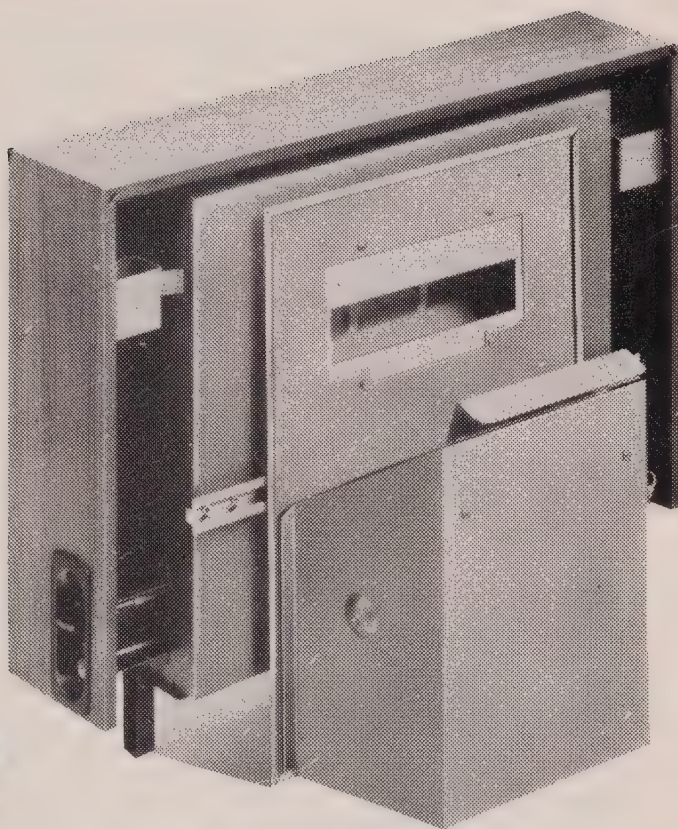
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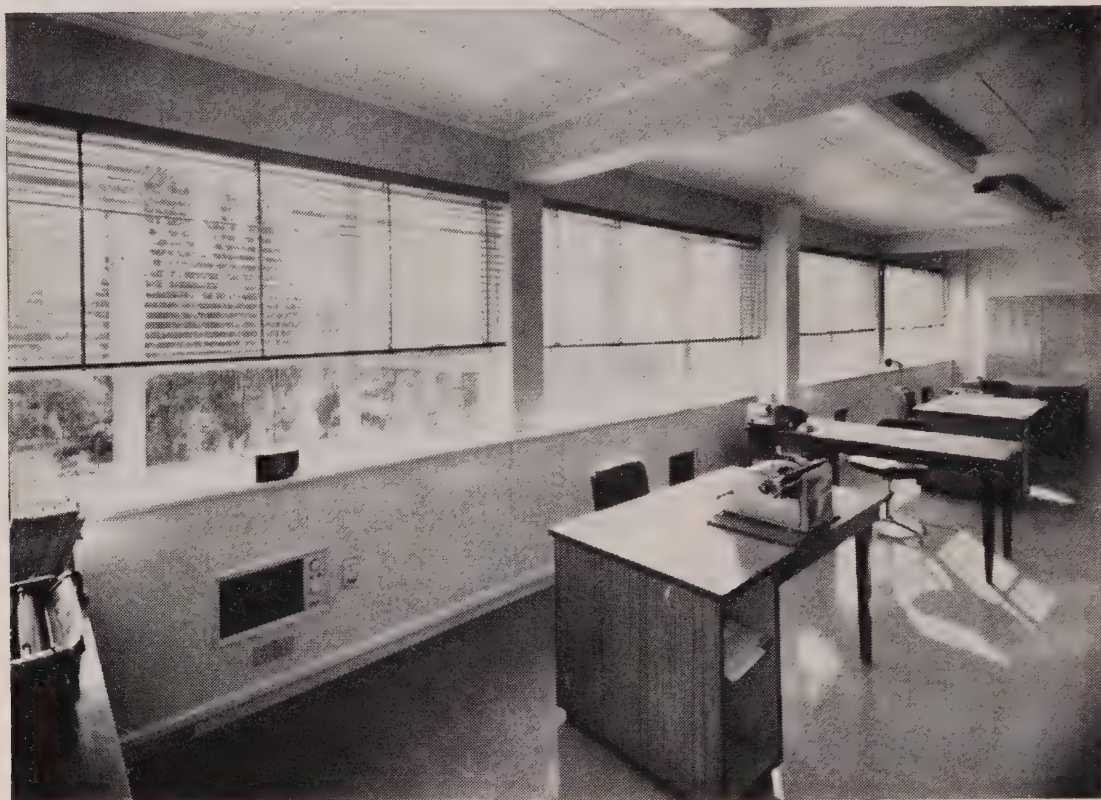
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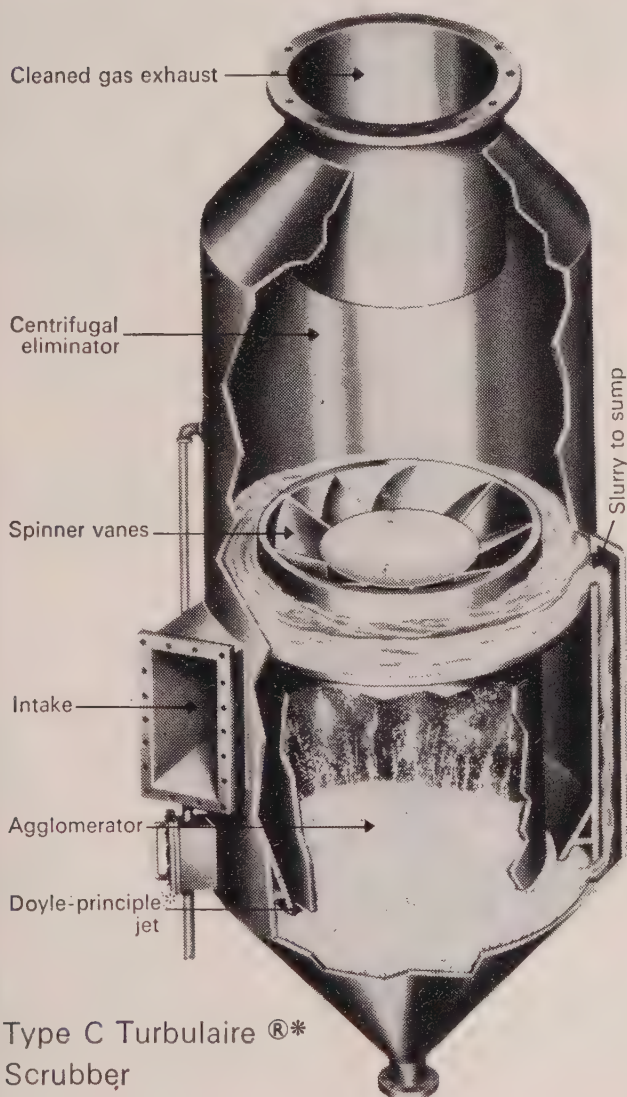


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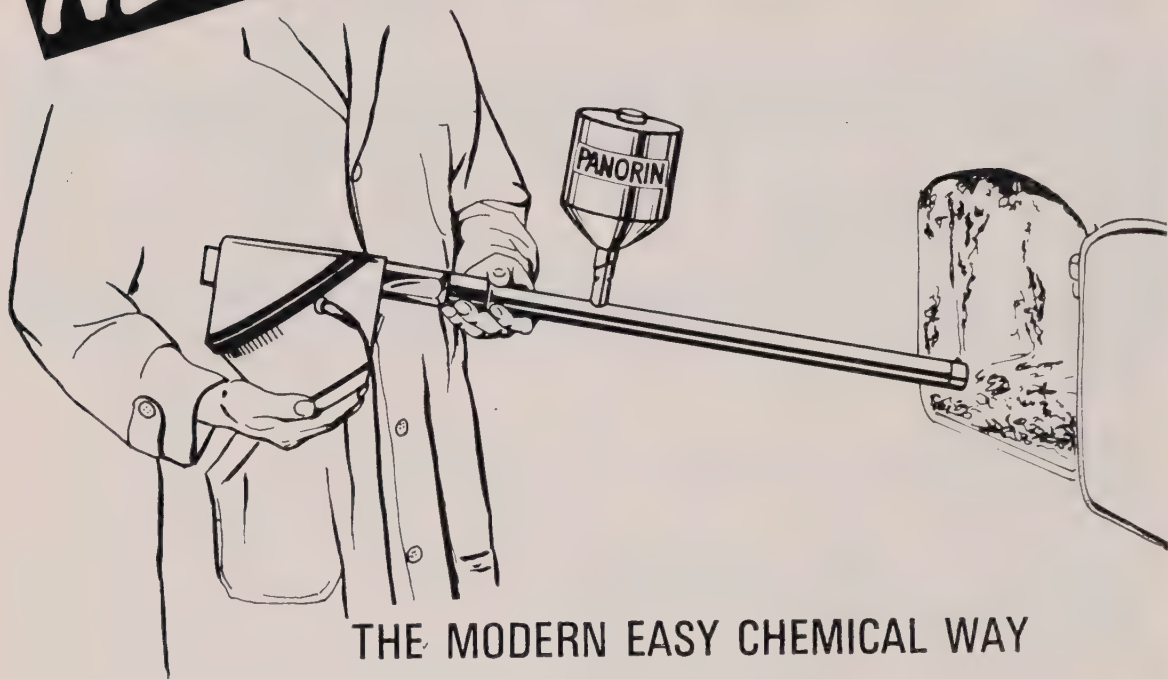
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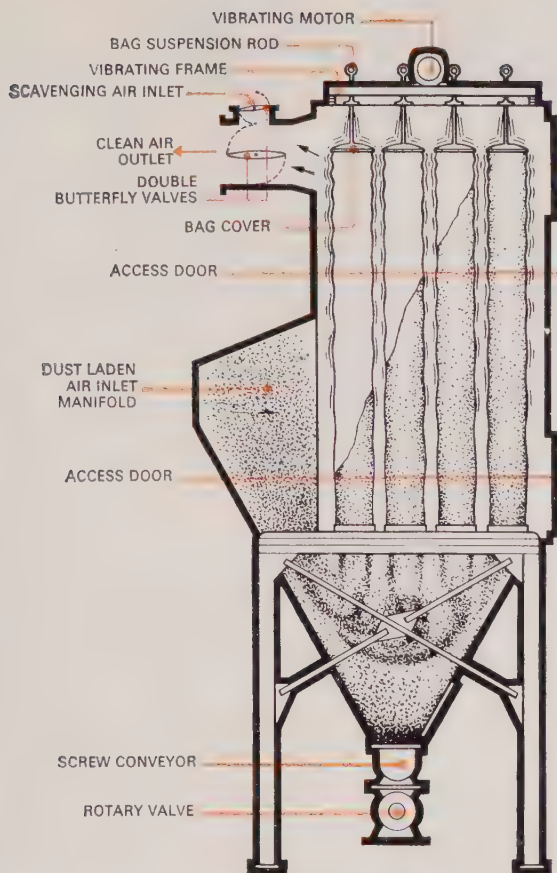
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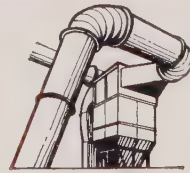


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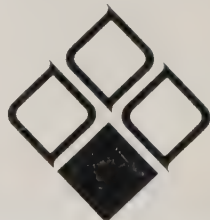
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# SMOKELESS AIR

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No. 153

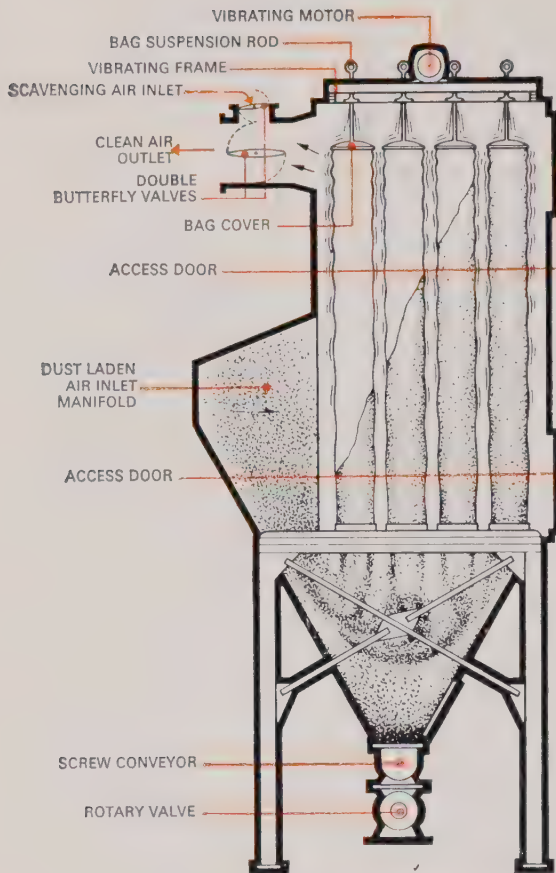
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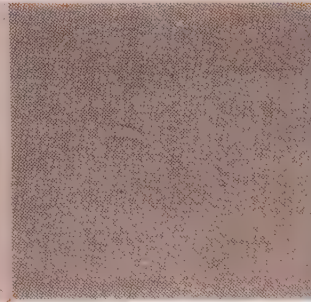
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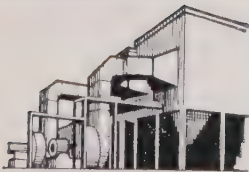
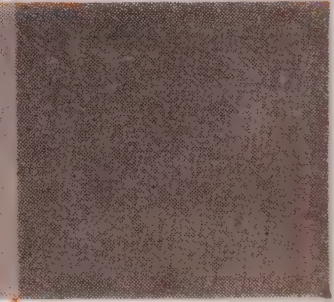
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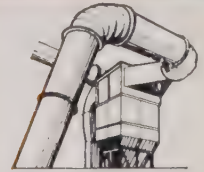


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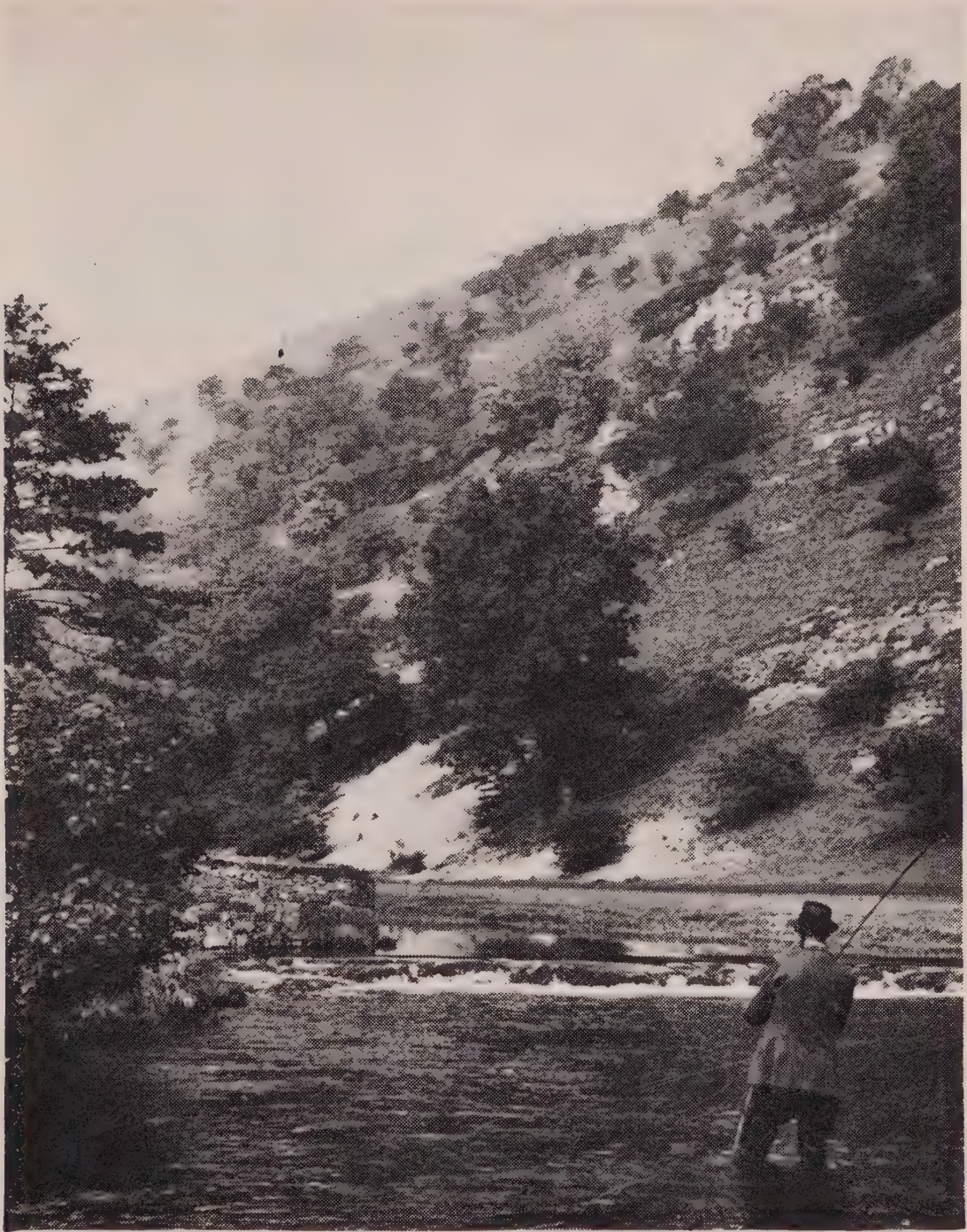
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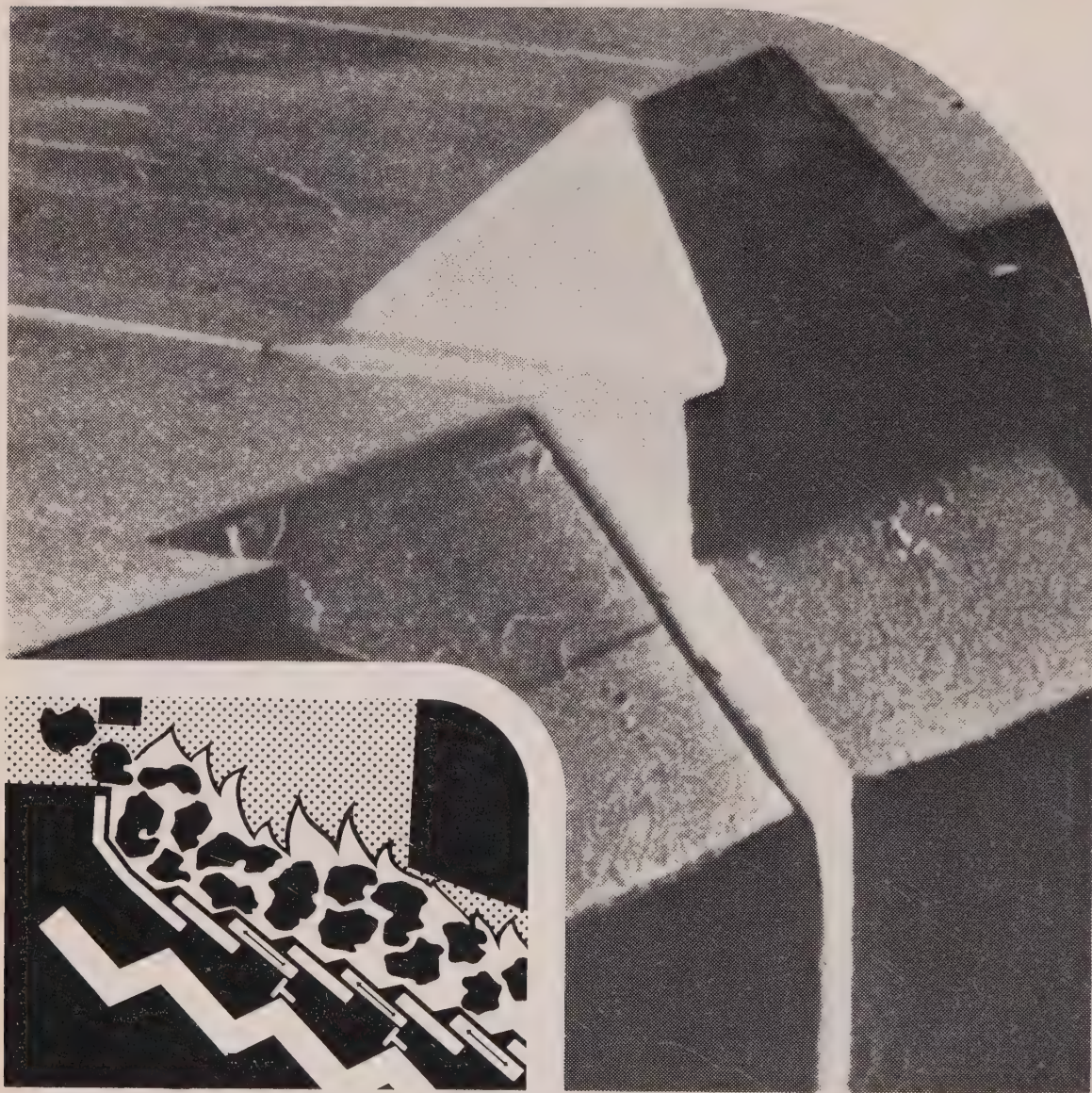
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# SMOKELESS AIR

Vol. XL No. 153

Spring 1970

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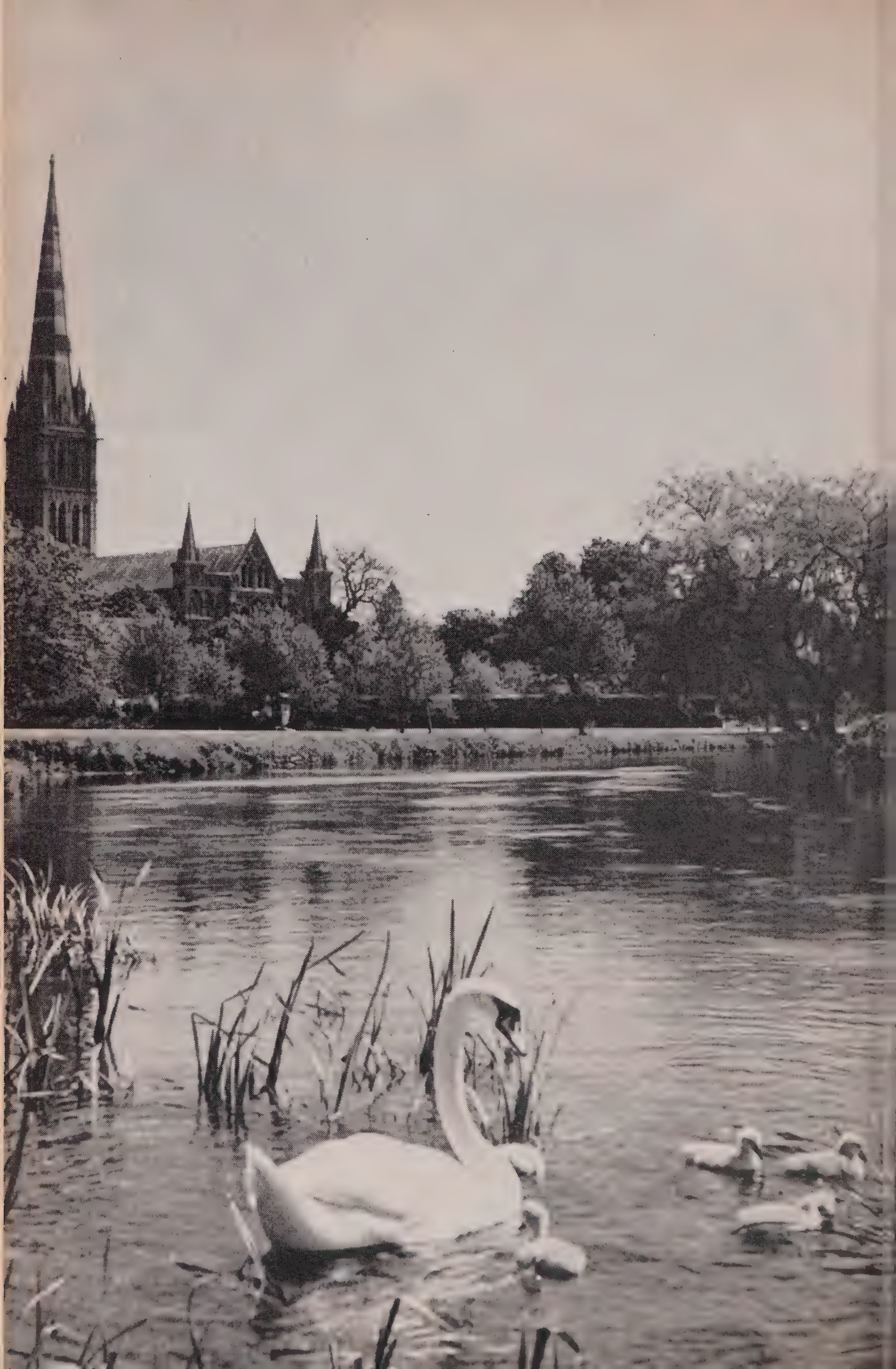
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*Ships, towers, domes, theatres, and temples lie  
Open unto the fields, and to the sky:  
All bright and glittering in the smokeless air*

# SMOKELESS AIR

## The Solid Smokeless Fuel Shortage

At the start of the New Year, 1970 Conservation Year, the Society issued the following press release:

“The National Society for Clean Air deplore the fact that some local authorities have been obliged, because of the inadequate supplies of solid smokeless fuels, to seek suspension of existing smoke control orders. This is a most disappointing state of affairs 14 years after the passing of the first Clean Air Act in 1956 and a depressing start for this country to the launching of European Conservation Year 1970, which emphasizes the need to improve our air and general environment.

So far, in the United Kingdom, Clean Air legislation regarding domestic smoke has achieved about only half its objective. Now, not only are some authorities seeking suspension of existing orders, but also because supplies of fuel cannot be guaranteed, the operational date of many new smoke control orders has had to be deferred until April 1971. It has been known for some time that the technological changes in the Gas Industry would reduce the supply of gas coke, and indeed the solid fuel industry made plans for new plants to meet this shortfall. The public were accordingly assured that their demands would be met. Nevertheless, because of the run down of coal gas works and because of delays and difficulties with the bringing into operation of the new plant, the production of solid smokeless fuel has not kept pace with the demand. As a result, the domestic smoke control programme is now badly held up in some areas, particularly in South Yorkshire.

Whilst it is hoped that the present shortage is a transient problem which will be cleared in 1971, that this situation should have been allowed to arise would seem to indicate a lack of proper consultation between the various authorities concerned. Immediate action is needed to increase the supply of solid smokeless fuel to meet the target promised in 1966. In the longer term this may entail expediting the operation of new plant; in the shorter term, it could mean the keeping open of obsolescent gas works to produce gas coke, admittedly a costly business; or the re-distribution of existing supplies of solid smokeless fuel.”

Since then the matter has been discussed in many newspapers, and commented on on television and radio. Leaders have appeared in many newspapers and on the 3 February the matter was debated in the House when Mr. Christopher Chataway for the Opposition moved "That this House deplores the failure of the Government to ensure the supplies of smokeless fuel necessary to implement the clean air policy, particularly in view of the stress laid on environmental pollution in recent Ministerial speeches". The opposition motion was defeated by 305 votes to 244, a majority of 61.

In winding up the debate, Mr. Harold Lever, the Paymaster General, for the Government, said that both the previous Conservative Government and the present Government had pushed ahead as fast as had been economically and technologically possible to reduce smoke in the atmosphere and increase smokeless zones. At the same time, smokeless fuels had been introduced into areas in the country—in some parts a 100 per cent.

Difficulties in forecasting the demand of particular smokeless fuel had, however, resulted in this winter's situation where there had been a tight supply. There had not been great hardship as had been suggested in the debate, nor great shortages. The level of supply had been in balance with demand, but there had not been a surplus.

There were 350 local authorities where smokeless zones prevailed and 16 who had asked and had received permission to suspend the 100 per cent enforcement of their smokeless zones.

There would have been a surplus of fuel had it not been for the technical difficulties that had occurred with the National Coal Board plant.

There was no hardship and the Coal Board had undertaken to see that there would be none. There was a tight position which might recur next winter, but there was no ground for panic.

So we are back where we came in. But whoever may be to blame, whatever may be the rights and wrongs of the situation, the fact remains that there is a shortage of solid smokeless fuel, and as a result, the Ministry of Housing and Local Government have granted orders to suspend the operations of their existing smoke control order to 16 local authorities. (See page 246.)

This country led the world in clean air legislation, legislation which has already achieved much in the battle against pollution. It is sad that in 1970, when the problems of the environment and pollution are becoming fashionable we should suffer this setback in our progress towards cleaner air.

However, it is up to us to ensure that this setback is only temporary and does not deter local authorities from going ahead with their smoke control programmes. Some are already doing so; if others follow their example, 1971 could see a sharp rise in the number of new orders being brought into operation.

At the same time, it is up to the Government to take steps that such a thing does not occur again. We hear a lot about planning these days; here is an instance where real planning is needed.



## Odours

In May last year, the Manchester District Regional Clean Air Council wrote to 72 Local Authorities asking them to forward details of sources of offensive odours known to them, and of any remedial action taken to try and alleviate the nuisances. The replies from the various authorities were sent direct to the Society and it was possible for us to collate the information as far as it went. The hope was that the Society could start a register and would be able to help other authorities by providing information about remedies that had been applied and been found successful.

Soon after this work was put in hand, however, and when information was beginning to be collected a resolution was passed at the November meeting of the Standing Conference of Co-operating Bodies. This resolution which was presented by Councillor E. R. Watkins, B.S.C., M.I.Mech.E., of Warwick Rural District Council, reads "that in order to assist co-operating bodies in dealing with odour problems this conference requests the Warren Spring Laboratory to set up a register listing the problems which have been encountered, the method used to overcome them and the degree of control secured. To this end co-operating bodies agreed to send the Warren Spring Laboratory information in relation to any problem encountered during the past five years."

Needless to say, the Director of the Warren Spring Laboratory agreed to undertake this task. There is no doubt that it will provide a very useful service and will be of great benefit to the community generally.

## The Motor Car and National Gas

It has been reported that Los Angeles, which of all cities is reputed to have the worst air pollution from motor vehicles, has discovered a workable solution to its problem. This is an inexpensive device which converts existing motor car engines from petrol systems to natural gas fuel systems. It is claimed that when this conversion has been made, the natural gas equivalent of a gallon of petrol costs approximately 60 per cent less, gives 15 per cent more mileage, substantially reduces engine wear and, what is important from our point of view, cuts out 90 per cent of the air pollution contaminants emitted by conventional motor exhausts.

Whether this will change motoring habits, as some commentators claim, remains to be seen, but it is interesting that in this country the Eastern Gas Board has taken a major step forward in helping to solve the problem of air pollution by fitting some of its vans and cars to run on liquid propane. The vehicles will be fitted with an optional "Flick of a Switch" changeover to petrol. If trials are successful, up to three hundred Eastern Gas vehicles could soon be propelled by this pollution-free fuel. The Eastern Gas Board say that there is every reason to expect that these vehicles will be a great success.

We must wait and see what the outcome is but it is certainly a most interesting development, which could do much to further the cause of clean air.

## Arnold Marsh Clean Air Awards

We would like to remind all our readers that the closing date for Clean Air Awards is the 31 March 1970. A number of entries in all classes have been received, but we would like to receive more.

Full details of the Clean Air Award Scheme are available in pamphlet form on request to the Society and complete details were given in the 1969 Spring number of "Smokeless Air".

Briefly awards will be made in three classes; to individuals, to industry and to local authorities. The first award will be made in October 1970, and in the first instance in order to recognize what has been achieved hitherto, awards will be made for achievements in the 15 years from 1 January 1955 to 31 December 1969.

In June 1969, Mr. Arnold Marsh, O.B.E., who was Director of the Society for 40 years and who had retired in 1968, died. In recognition of the great work which Mr. Marsh did for Clean Air during his lifetime, it was unanimously agreed by the Executive Council of the Society, that the Clean Air Awards should be known as "The Arnold Marsh Clean Air Awards".

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## Measurement of Dust Concentration and Dust Concentration and Size in Ducts and Chimneys

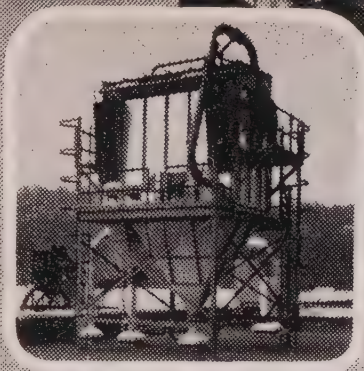
The Department of Civil Engineering/Chemistry and Applied Chemistry of the University of Salford announce that a two-day course in this subject will be held at the University on Thursday and Friday, 2 and 3 April 1970. This is an instructional course for industrial, public health and local authority employees who, as a result of recent legislation, require detailed knowledge of dust sampling and sizing techniques. It is not intended as an advanced course for those experienced in this field. The course fee will be £5. Further details may be obtained from the Administrative Assistant (Short Courses), Room 111J, University of Salford, Salford, M54 WT.

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## INTERNATIONAL HEATING, VENTILATING AND AIR CONDITIONING EXHIBITION, OLYMPIA, LONDON, APRIL 20-25

HEVAC, it is claimed, will be the largest exhibition of its kind yet staged and will be opened by the Rt. Hon. Anthony Wedgwood Benn, Ministry of Technology. Hevac is organised by Industrial Exhibitions Limited and sponsored by the Heating, Ventilating and Air Conditioning Association. In association with the exhibition, the Hevac Association has organised an international district heating convention, in which the Society will be playing its part.





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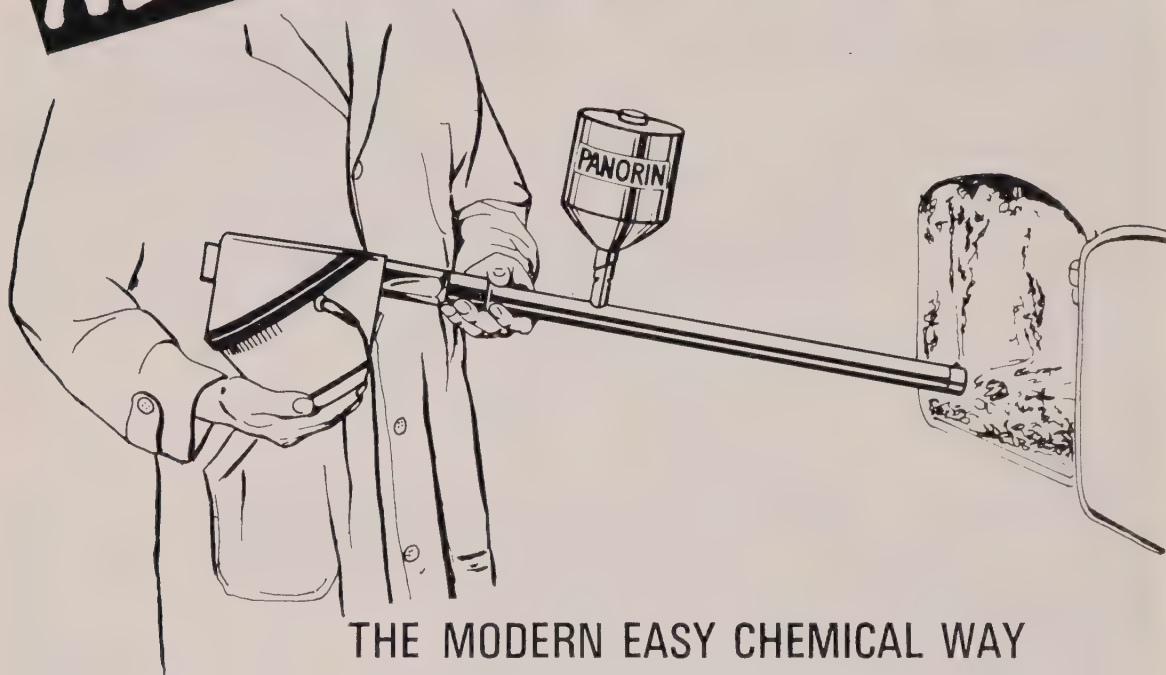


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# The Prevention of Air Pollution from Oil Refineries

A Paper presented to the Annual Conference of the Scottish Division at Largs on 22 May, 1969.

*by K. J. Marsh, The British Petroleum Co., Ltd.*

The widespread use of oil products in the last hundred years has made a considerable contribution to the welfare of mankind, but as with other important technical developments—for example, the development of penicillin—the benefits have brought some undesirable side effects. These are associated mainly with the problem of the air pollution which results from the use of these products to provide energy from combustion, and the air pollution problems are therefore similar to those resulting from the combustion of other fossil fuels. But there are problems which are specific to petroleum products and this article will describe the particular problems which arise during the refining of crude oil into usable products and how they are tackled in modern refineries. It is hoped that it will also show how seriously refinery managements take their responsibilities in reducing to a minimum any nuisance which may be caused by refinery operations.

Crude oil, which is the raw material of an oil refinery, is a complex mixture of hydrocarbons ranging from gases with simple molecules to bitumens with complicated molecules, but it also contains small quantities of other elements, such as sulphur, oxygen, nitrogen and some metallic compounds. Its composition varies considerably from one oil field to another. The type of refinery required to process crude oil depends upon the products which are required from it and, to some extent, on the crude oil itself so that no two refineries are completely alike. However, they have many common features and many common problems in controlling the discharge of atmospheric pollutants.

## **Possible Sources of Atmospheric Pollutants**

Before considering the various control methods used in refineries it is convenient to consider the possible pollutants which are produced in refinery operations and their sources. These are summarised in the following list.

- Sulphur Oxides
  - combustion in boilers for steam generation and in furnaces for distillation and other processes.
  - combustion of excess of hydrogen sulphide in sulphur recovery plants.
  - catalyst regeneration.
  - flares.

Smoke	— combustion in boilers and furnaces. — flares.
Hydrocarbons	— evaporation losses from tank farms. — loading operations (tanks, trucks, ships). — oil slicks in drains and water separators. — leaks from pumps. — flares (during incomplete combustion due to excess throughput).
Carbon monoxide	— catalyst regeneration (especially from catalytic cracking).
Solids	— catalyst fines from regeneration. — combustion (grit and smuts).
Odours	— sulphur compounds (hydrogen sulphide and mercaptans). — aldehydes, phenols, organic acids.

### **Control Methods—The Tank Farm**

If the course of the oil is followed through the refinery, the journey begins and ends in the tank farm, where the crude oil is stored upon receipt and the products are stored before despatch. Here, the main source of air pollution is the loss of hydrocarbons by evaporation. This can occur during the filling of tanks, when the expelled air is saturated with petroleum vapours, and by the “breathing” of tanks when air temperature changes cause expansion or contraction of the gas volumes in the tanks and a consequent movement of the air in and out of the tank vents. The hydrocarbons do not represent a significant health hazard, but their odours can create a nuisance, particularly the odours from crude oils. The most commonly used methods for reducing this evaporation loss is to use floating roof tanks. In these, the roof floats on the surface of the tank contents so that there is no air space above the liquid and no saturated vapours to be expelled during the filling. Careful attention has to be paid to the sealing between the roof and the tank walls and it is difficult to prevent some loss of hydrocarbons from the exposed walls as the roof drops during emptying. These tanks are more expensive to install than fixed roof tanks but, nevertheless they can contribute to a significant reduction in the loss of hydrocarbons.

### **The Process Units**

The principal emission to the atmosphere is due to the combustion in the furnaces for heating the products to be processed. These furnaces burn fuel oil or excess refinery products such as waste gases and this varying fuel supply means that there must be a careful control of combustion conditions in order to maintain the maximum efficiency. Many refineries, for example, install smoke meters in the stacks which give a warning in the control room if the stack is smoking. This constant control of the combustion conditions ensures that the emission of solids in the form of grit and smuts is kept to a minimum and the products of combustion are mainly gases, of which the most significant pollutant is sulphur dioxide. The amount of sulphur dioxide discharged from a refinery depends very much on the sulphur content of the crude oil which is being processed and on some occasions this may be quite low. The combustion gases must, however, be



released from high stacks in order to dilute them in the atmosphere before they reach ground level. In many modern refineries, the effluents from the various units are all ducted to one central stack, which may be of the order of 450 feet high.

The units can sometimes give problems due to the release of hydrocarbons or odours. For example, they have to be fitted with safety valves to prevent the build up of excess pressures and these may open on rare occasions; the vapours are then usually emitted from high vents. Pumps and compressors are widely used in the process units, often operating at high pressures, and these have been a cause of smells in the past due to leakages at the seals. Considerable attention has been paid to this problem in recent years and various remedies have been adopted. These include the widespread use of mechanical seals, the use of totally enclosed systems where both pump and motor are immersed in liquid, or the placing of hoods over the critical seals.

In some units, steam has to be injected into the oil stream in order to facilitate the process (for example, in the distillation units) and this is eventually condensed and separated from the overhead gas fraction. The condensed water may contain dissolved hydrogen sulphide and mercaptans and may be odorous. The vacuum distillation unit presents a particular problem in this respect because additional steam is required to produce the vacuum by means of venturi jets and condensers. Some cracking of the heavier oil components takes place and there tends to be a higher concentration of the odorous components in the condensed water, which must therefore be handled with extra care. One solution to this odour problem is to use the sour water for desalting the crude oil: the hydrogen sulphide dissolves in the crude oil and then passes into the refinery gas system during the processing. Alternatively, the sour water may be stripped with hot flue gases and the odorous components are then sent up the stack.

Most refineries include units which convert unwanted products into wanted products. These processes may involve the breaking up or "cracking" of heavy oil components into light components or the modification of light components to give better product quality and usually require high temperatures and pressures. The development of catalytic methods now enables the processes to be carried out at lower temperatures, but the regeneration of the catalysts can give rise to particular emissions. The frequency of regeneration may vary from once every few months to continuous regeneration. In the catalytic cracking process, for example, the catalyst will be in the form of a fine powder and this is regenerated continuously. The discharge from this regeneration includes a fine dust, which must be removed in cyclones, and carbon monoxide, which may be present in concentrations of up to 7 per cent in the effluent gases. This must therefore be released from a high stack but, in some refineries, it passes first of all to an incinerator where the carbon monoxide is burnt to carbon dioxide and the heat produced is used for steam generation. The condensed water from the catalytic cracker is particularly smelly and must be stripped of its odorous components before it enters the refinery sewers or returned to the crude desalters.

In older refineries the final stage in the refining of distillate oil products often involves a chemical treatment to remove sulphur compounds. There are many of these treatments and the chemicals used include, caustic alkali, sulphur dioxide and sulphuric acid. After use, the chemicals contain a high concentration of sulphur compounds and can be very smelly; as far as possible they are regenerated and used again but sometimes their ultimate disposal can present an odour problem. If there is no acid recovery unit, acid tars from the use of sulphuric acid may be neutralised with spent caustic or burnt in a special incinerator. Various methods are used for disposing of spent caustic, varying from dumping at sea to injection into the crude oil.

However in recent years, many of these washing treatments have been replaced by catalytic desulphurisation processes and these can now be used for nearly the whole range of atmospheric distillates. The sulphur compounds can then be removed at an early stage in the refining process, usually in the form of hydrogen sulphide which is passed to a sulphur recovery plant where it is converted to sulphur. As a result, there is a considerable reduction in the risk of refinery smells due to accidental leaks or to the handling of smelly washing chemicals.

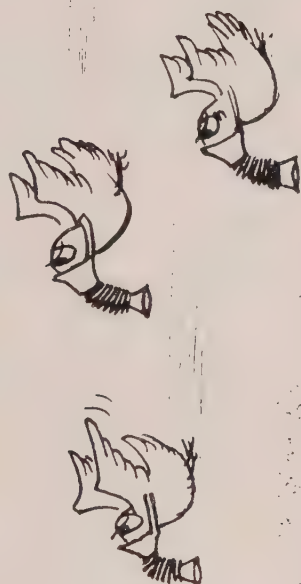
A refinery processing about five million gallons of high sulphur crude a day may have to handle as much as one million cubic feet of hydrogen sulphide every day in the refinery gases. The conversion of this to sulphur in the sulphur recovery plant represents a significant expense in pollution control in the refinery because the sulphur may have to be sold at a loss—usually the plant has to be over designed in order to cope with surges of gas due to variations in the crude feed to the refinery so that it normally operates below its designed throughput and does not run efficiently. However, it reduces the amount of sulphur which would otherwise have to be released to the atmosphere as sulphur dioxide and, over Great Britain as a whole, this represents a reduction of about 40 per cent of the sulphur dioxide which would otherwise have been emitted from refineries.

### **Refinery Services**

Refineries require steam and electrical power for their operations and therefore usually include their own power station. Even if electrical power is purchased from outside, steam raising plant is necessary and the fuel is obtained from the refinery throughput. Usually the power station is the major emitter of sulphur dioxide in the refinery and consequently it must have a high stack although, as mentioned above, this stack may also be used for the flue gases from other refinery units.

Drain water from the units and from the tank farm may be mixed with oil components, either in solution or as surface slicks and can be a source of hydrocarbon evaporation and smell. The water discharged from the refinery is usually passed through oil separators and these have to be large in area, so they may be a source of hydrocarbon evaporation and smell. As far as possible the more odorous water is stripped before it reaches the effluent treatment plant but it is difficult to avoid some smell close to the plant and the general solution is the maximum reuse of water within the refinery.





CORK

A characteristic feature of all refineries is the flares, which are used for burning excess gases. For reasons of economy as little gas as possible is burnt at the flare and only a pilot flame is kept burning, but large quantities of gas may have to be burnt in periods of operational disturbance due, for example, to planned or accidental shut down of plants. Various types of flares are used but none can cope efficiently with the large variations in throughput they are sometimes required to handle. When large volumes of gas are to be burnt there may be incomplete combustion, resulting in a smoky flare. Various solutions are adopted to reduce this smoke problem and the most commonly used is to inject steam into the flare. This, however, needs manual control of the steam and is noisy—it also requires a large volume of steam and there may not always be sufficient steam available.

### **General Comments**

It can be seen that, although many refinery operations are potential sources of air pollution, the problems are well understood and the sources can be controlled. Methods of crude oil refining are constantly changing and the development of new processes and equipment must always include the means of reducing air pollution to a minimum. The oil industry is extremely conscious of its duty to reduce to a minimum any air pollution nuisance due to its operations and, although there is often fierce commercial competition between the various companies in their marketing operations, there is a close liaison and co-operation in pollution matters.

For example, in Great Britain, the Institute of Petroleum, which is supported by the major oil companies, has set up a number of committees to deal with air, sea and water pollution and to ensure that there is an inter-change of information on these matters. In the wider European context the oil companies have set up an international organisation called CONCAWE (*CON*serva*tion* of Clean Air and Water—Western Europe) with the aim of studying common problems in the field of air and water pollution. The companies supporting CONCAWE now represent 80 per cent of the refining capacity of Western Europe. The large support given to CONCAWE is a measure of the considerable interest in pollution taken by the oil industry.

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## **OBITUARY**

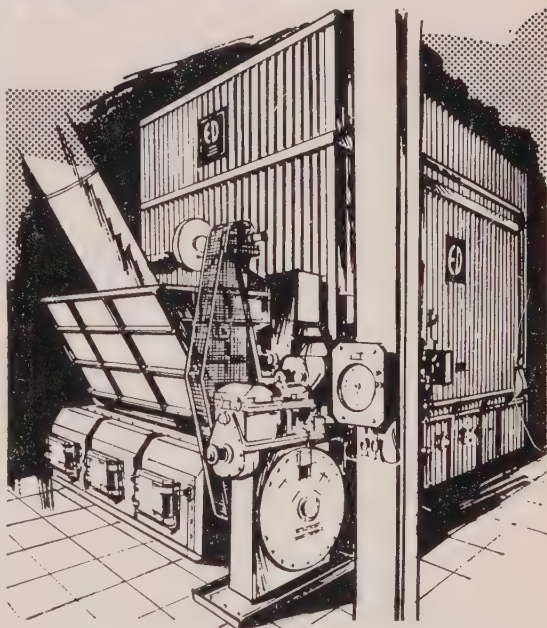
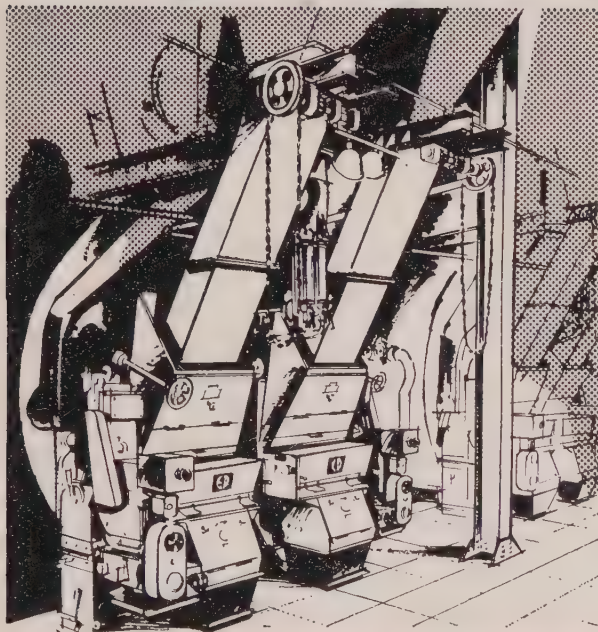
It is with regret that we have to inform our readers of the death of Mr. Sidney N. Duguid, J.P., B.S.C.Tech., F.R.S.H., who was for many years a member of the Society and who did much for Clean Air. Mr. Duguid died on the 2 September, 1969.

Mr. Duguid was a founder member of the Institute of Fuel and was made a Fellow in 1943.



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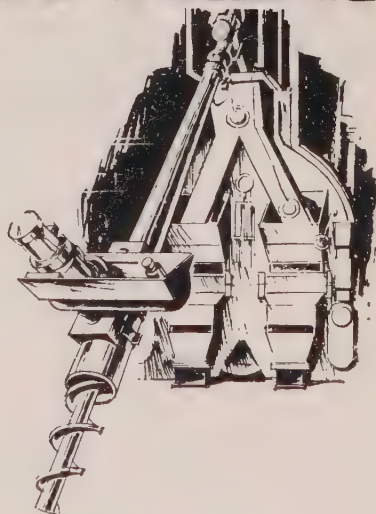
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# AIR POLLUTION IN QUEENSLAND

by Alan Gilpin, B.Sc(Econ) M.Inst F., Assoc. I.E. Aust.

*Director of Air Pollution Control, Queensland*

Of the six States of the Australian Commonwealth, Queensland, ranks in area and third in population. Comprising 667,000 square miles it is equivalent to more than seven times the area of the United Kingdom, while its population of 1.7 million does not exceed that of Staffordshire, Surrey or Kent.

Brisbane, the capital of the State, has a population of over 660,000. Together with the nearby towns of Ipswich, Redcliffe, Toowoomba and the famous Gold Coast ("heaven down-under") about half the population of the State lives in the south-east corner of Queensland.

Distances are otherwise considerable. Townsville lies about 700 miles to the north and Mt. Isa about 1,000 miles to the north-west. Other centres such as Gladstone and Maryborough are situated at more reasonable distances (300 and 150 miles respectively) north from Brisbane.

Queensland is a modern state. The farthest centres are reached readily by air, while the nearer centres are accessible along fast modern motorways. Manufactured goods and minerals now account for over half of the State's gross domestic product, the balance consisting of the products of the more traditional Queensland industries, sugar, beef, wool, vegetables, wheat, tobacco, fruit and cotton.

Queensland produces oil at Moonie (two oil refineries utilising indigenous and imported crudes stand at the mouth of the Brisbane River); natural gas at Roma (about half of which is used as a chemical feedstock for ammonia production at a large chemical fertiliser complex in Brisbane); bauxite at Cape York Peninsula (which is converted to alumina at the world's largest alumina refinery at Gladstone); sugar from over thirty sugar mills; cement from several large cement works; timber products from a large number of timber works; electric power from a range of power stations (construction has now commenced on a 1,100 mW power station for Central Queensland); coal from Ipswich and various areas of Central Queensland; copper, silver, lead and zinc from Mt. Isa (with a large copper refinery at Townsville). Indeed before long Mt. Isa will be the largest silver, lead and zinc centre in the world.

With such a large industrial component it is not surprising that Queensland (along with the other Australian States) should have examined its air pollution problems, both actual and potential.

A Survey conducted in 1959/60 revealed that:

- (a) Measured pollution levels in Brisbane were somewhat less than those of Sydney, but higher than expected;
- (b) The natural ventilation of the Brisbane area is at times far from satisfactory, particularly in the winter months when frequent temperature inversions occur;
- (c) Brisbane, because of its location and topography, has a climate which could lead to the worst atmospheric pollution of any capital city in Australia, if pollution rates became high. That is, it has the highest pollution potential.

Undoubtedly Brisbane's hills and temperature inversions combine at times to prevent the dispersal of pollutants; furthermore the air pollution problem is aggravated by the development of industry in the City in a south-west/north-east direction, which is in line with the prevailing winds. There are resemblances with the Los Angeles situation not only in respect of topography and inversions but also in respect of abundant bright sunlight and high temperatures which could activate the formation of photochemical smog. The possibilities here are accentuated by high vehicle densities in Brisbane. Fortunately pollution from domestic sources is small, although back-yard incineration may sometimes be a source of nuisance. As a result of this Survey a Clean Air Act, far-reaching in scope, was passed by the State Legislature late in 1963.

The Act is brought into operation by proclamation within the Local Authority areas specified in the proclamation. The Act was proclaimed on 8 May 1965 in Brisbane and Ipswich. Gradually the Act is being brought into force in other areas of the State, but it will be some years before the Act covers the whole of Queensland. The Act is binding on the Crown and industries and vehicles of all kinds come within its scope. Local Authorities have no powers under the Act.

The Act is administered by the Minister for Health, and on behalf of the Minister by the Air Pollution Council of Queensland. This body comprises a Chairman and nine nominated members appointed for three years. The Council comprises representatives of industry and commerce, the University of Queensland, and other Government Departments. It is a well-informed body; experienced minds are thus brought to bear on a multi-disciplinary subject, the facets of which include problems of a social, economic, legal, meteorological, scientific and engineering nature. The Council meets on a minimum of six occasions a year.

The Act provides for the appointment of a Director of Air Pollution Control and for other officers as may be required. The Director is the chief administrative officer for the purposes of the Act and is responsible to the Minister and the Council accordingly. The Director is head of the Division of Air Pollution Control created within the State Department of Health.

The Act divides industries into scheduled and non-scheduled categories. The scheduled industries (see Appendix) are licensed, and pay an annual



fee which is paid into an Air Pollution Trust Fund. Currently about \$A15,000 per annum is received in this way. The Fund may be drawn on only for air pollution investigation and research purposes.

The scheduled industries in existence at the time of the proclamation of the Act have a period of seven years within which to make structural alterations to existing plant. This period of grace does not, however, cover extensions to an existing plant or to new equipment that may be installed after the Act is proclaimed. The Act provides that in the event of a specified breach of the provisions of the Act, the seven year period of grace may be waived in a particular instance. Occupiers of scheduled premises can appeal to the District Court against a decision of the Air Pollution Council. Over 100 works in Brisbane alone are now licensed.

The non-scheduled premises covered by the Act comprise numerous but generally minor users of fuel, who may contribute to air pollution in the use of fuel burning equipment or by incineration of waste products. These premises are subject to the same standards as scheduled premises, but are not required to be licensed or to pay a licence fee. The occupiers of non-scheduled premises also have a right of appeal to the District Court.

The Air Pollution Council may exempt any premises temporarily from the provisions of the Act—as for example, after a fire or while new equipment is being tested, but the exemption periods are not long. In certain circumstances, the Minister may close premises.

### **Prior Approval of New Industry**

Under Section 27 of the Clean Air Act, scheduled premises may not be established or extended (or alterations carried out therein to industrial plant or fuel burning equipment) in proclaimed areas (such as Brisbane and Ipswich) unless:

- (a) the plans and specifications of such works or buildings (or alterations or replacements to existing plant and buildings); and
  - (b) the site on which such work is to be carried out,
- have been approved by the Air Pollution Council of Queensland. In respect of siting, many of the problems associated with down-river industrial development have yet to be resolved.

### **Clean Air Regulations, 1968**

The Queensland Clean Air Regulations came into operation on 1 August 1968. Standards of emission relating to smoke, particulate matter, fume, sulphuric acid mist, sulphur trioxide, fluorides, chlorine, hydrogen sulphide, oxides of nitrogen, copper, lead, arsenic, antimony, cadmium and mercury are laid down. The standards were set by the Air Pollution Council following the fullest discussions between all branches of Queensland industry and the Director of Air Pollution Control. Regulations are in preparation to make positive crankcase ventilation compulsory on all new petrol-driven vehicles. Over half-a-million vehicles are registered in Queensland.

### **Division of Air Pollution Control**

The work of the Division embraces all those air pollution control activities undertaken by Alkali Inspectors and Chief Public Health Inspectors in

Britain. In addition it conducts all necessary monitoring, testing and analytical work undertaken in Britain by the Government Analyst and the local Public Analysts. The functions of the Division's scientific team include the following:

- (1) The conduct of a long-term ambient air quality measuring programme to determine both the nature and concentrations of air pollutants and the trends, diurnal, seasonal and secular;
- (2) The measurement of "fall-out" around specific works wherever and whenever the need arises;
- (3) The carrying out of stack tests to determine the extent to which the emission standards laid down in the Clean Air Regulations, 1968, are being complied with.

The function of the Division is not merely to enforce legislation but to provide scientific and engineering advice to industry in need of it, and to examine engineering proposals placed before the Division.

An important aspect of the work during the last four years has been:

- (1) The designing and equipping of an air pollution centre comprising offices, laboratories, library and conference rooms.
- (2) The purchase of suitable monitoring and analytical equipment.
- (3) The appointment of graduate staff in science and engineering, to provide the necessary services.

The salaries of the more senior appointments, e.g. senior chemist or air pollution control engineer, are of the order of \$A8,000 (about £3,750 sterling). The staff establishment now stands at nine, but a full establishment of 17 is envisaged.

The air pollution centre, fully air-conditioned, and splendidly equipped was officially opened in March 1968, by the Minister for Health. The cost of providing the centre was approximately \$A250,000.

### **University of Queensland**

In addition to the above activities, the Director presents a short course of lectures to chemical engineering undergraduates at the University of Queensland. As a result of this air pollution control has become an examined topic, with the Director function as Examiner. This arrangement ensures that chemical engineering graduates emerge who possess a basic introduction to the subject.

### **Interstate and Overseas**

To maintain a liaison between States an annual technical conference is held, attended by officers directly concerned with air pollution control. These annual meetings have proved invaluable. A Clean Air Conference, similar to those held by the National Society for Clean Air, has been held every three years although shorter intervals are now envisaged. Opportunities for overseas travel occur from time to time, permitting visits to New Zealand, the United States of America, the United Kingdom, Western Europe and Japan.

### **The Future**

Much progress has been made in establishing effective air pollution control in Queensland, in an endeavour to combine massive industrial



development with the preservation of a reasonable air quality. The atmosphere of mutual co-operation between the Division and industry is exemplified by the free exchange of ideas, knowledge and techniques which takes place at all levels. All this augurs well for the future, and exemplifies the comment by Senator G. H. Branson, Chairman of the Senate Select Committee on Air Pollution, that among Australian States "Queensland is undoubtedly one of the leaders in this field".

## **APPENDIX**

### **Scheduled Premises**

Any premises:

(a) being used for—brick, tile, pipe, or pottery works; cement works; chemical manufacturing works; coal or oil gas works; metallurgical works reclaiming metal from scrap; metallurgical works smelting or converting ores to metal of any kind; an oil refinery; a sugar mill;

(b) on which there is erected any—boiler or boilers consuming or capable of consuming either alone or in the aggregate more than one ton of coal per hour or its equivalent heat value based on the use of coal having a calorific value of ten thousand British Thermal Units per pound of weight; coke oven; furnace used for the melting of non-ferrous metals; furnace or cupola used for the melting of alloys of iron or steel;

(c) on which any fuel burning equipment or industrial plant is operated by the Commissioner for Railways under "The Railways Acts, 1914 to 1961".

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**Have you booked your  
flight to Washington ?**

***See Page 207***

# OPEN MEETING & LUNCHEON

London, Friday, 5th June 1970

## OPEN MEETING

At 12.30 p.m., immediately after the Annual General Meeting of the Society (for which a separate notification has been made to members) there will be held, at the Connaught Rooms, Great Queen Street, London, W.C.2, an Open Meeting, to be addressed by

**Mr. Christopher Chataway, M.P.**

The Opposition Front Bench Spokesman on Environmental Matters

## LUNCHEON

Following the Open Meeting there will be the Society's Annual Luncheon, also at the Connaught Rooms, at which Mr. Christopher Chataway will be the Principal Guest. The President, Sir Kenneth Hutchinson, C.B.E., F.R.S., will be in the Chair.

Members are invited to bring friends with them to the luncheon, tickets for which will be reserved on receipt of the application form below. The price per ticket is 37/6 inclusive of gratuities but not drinks.

*P. G. Sharp*

Director

-----  
*The Director,  
National Society for Clean Air,  
Field House, Breams Buildings, London, E.C.4*

Please reserve and forward in due course.....ticket(s) for the Luncheon on 5th June 1970, for which I enclose 37/6 per ticket.\*

Signed.....

Name and Address for tickets  
(BLOCK letters, please)

.....

.....



# Visit the United States and the International Clean Air Conference

The second International Clean Air Conference will be held in Washington D.C. from the 6-11 December, 1970. It is proposed that the Society should charter an aircraft to enable delegates and their wives, exhibitors and the presenters of papers to visit Washington as cheaply as possible.

It is proposed to charter a VC10 aircraft with 137 seats. The aircraft would leave London on Thursday the 3 December and return from Washington on Sunday the 13 December. In each case, the flight would be during daylight hours.

*Scheme A:* Return flight to and from Washington only at a cost of £65 per person.

Under this scheme passengers would be responsible for finding their own accommodation in Washington.

*Scheme B:* Return flight to and from Washington as in Scheme A, plus accommodation in the Washington Hilton Hotel for ten nights. Accommodation would be in twin-bedded rooms with private bathrooms and include breakfast. The charge for the flight and accommodation would be £115 per person. For an additional £2 6s. per person per day, that is £23 for the 10 days, single rooms would be available under this scheme.

We must make it clear at the outset that preference for seats under either Scheme A or Scheme B will be given to authors of papers and exhibitors. There will, however, be a number of seats available to members and their wives. If you are interested, will you please fill in the slip at the bottom of this page and return it to the Headquarters of the Society at Field House, Breams Buildings, London E.C.4, not later than the 27 April. Seats will be allocated strictly on a first come first served basis.

---

## NATIONAL SOCIETY FOR CLEAN AIR International Clean Air Conference Washington, December, 1970

I wish to reserve ..... seats on the charter flight to Washington

I am interested in scheme A/B (cross out which does not apply)

If Scheme B state accommodation required .....

Name ..... (BLOCK LETTERS)

Address ..... (BLOCK LETTERS)

.....  
Telephone .....  
.....  
Signature .....

## Environmental Pollution—Royal Commission

At question time in the House on 11 December last, the Prime Minister stated: "I asked my Rt. Hon. Friend (The Secretary of State for Local Government and Regional Planning, Mr. Crossland) to go urgently into the question of environmental pollution in all its forms and to make proposals to me on how the problem should be dealt with.

My Rt. Hon. Friend has now reported. He is setting up a permanent central unit, composed mainly of scientists on his own staff, to assist him in his co-ordinating role on environmental pollution. Through his staff he will maintain close relations with the Chief Scientific Adviser to the Government, and with the Research Council and other Institutions concerned with the problem. Following my Rt. Hon. Friend's report to me, I have recommended, and Her Majesty the Queen has been pleased to approve, that a standing Royal Commission on Environmental Pollution should be set up with the following terms of reference:

To advise on matters, both national and international, concerning the pollution of the environment; on the adequacy of research in this field; and the future possibilities of danger to the environment.

It is intended that this shall be a standing commission able to take up any problem relating to pollution so that the benefit of the best possible advice will be available to Government Departments responsible for executive action. . . .

On the general question of environmental pollution, the Government intend to present to the House a White Paper next year. This will show how much so far has been achieved under the existing arrangements which our new proposal will greatly reinforce.

---

Have You Reserved Your Tickets  
for the Open Meeting and Luncheon?  
See page 206



# **Nottingham City Council saved £35,500 by installing the Baxi Fantom.**

## **What about your smokeless zone?**



The Fantom is the cheering, heart-warming answer to the cold facts of the Clean Air Act. Now, no one need give up a real living open fire even in a smokeless zone. The Fantom has been designed in conjunction with the National Coal Board.

The Fantom's secret is its built-in electric fan that streams air up through the fuel, noiselessly, continuously, and controllably. Switch on, and all smokeless fuels burn brightly, to give a glowing, living open fire.

They started installing 3,500 Fantom fires in the Bilborough, Beechdale, area of Nottingham early last year to be ready in time for the zone going smokeless in June, 1968. Installation was completed three months ahead of schedule. Because of the fact that the Fantom is so easy to install—literally only 2 screws are needed—fitters were putting in 11 or 12 fires a day. So Nottingham City Council saved even more money in labour time. Nottingham isn't the only 'Fantom Town'. Many others are also installing Fantoms.

### **What a council gains: Nearly £10 on every appliance**

With an average installed cost of only £16.5.0. the Fantom is easily £10 cheaper than any other domestic appliance designed and guaranteed to burn smokeless fuels brightly.

May we give you a demonstration?

Please write to:  
Richard Baxendale & Sons Ltd.,  
Bamber Bridge, Preston, Lancs.  
PR5. 6SN (Dept. SA. 6)

**Baxi Fantom**  
**the power behind the living fire**



***“They’re burning  
50 tons of waste  
per day down there!”***



***“Well where’s the smoke?”***



***“And where’s the smell?”***



### ***There isn’t any!***

The Universal system of incineration ensures complete combustion of all waste materials. Sealed flame, three stage combustion with complete air control to all stages eliminates air pollution emissions, without smell, smoke or fly ash. Refuse reduced to 5% clean, dry sterile ash with a low fuel bill. Universal incinerators are efficient, compact, precision engineered units complete with a stainless steel stack of only 30'. In addition, the incinerator is designed to dispose of bulk refuse through the front opening on a refractorised trolley taking articles of up to 6' x 4' x 8'.

*Details of complete Municipal Turn-Key Projects are available on request.*



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Ring Road, Beeston, Leeds 11.  
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# CLEAN AIR IN THE BURGH OF COATBRIDGE

by J. Bryden

Coatbridge, one of the large burghs of Scotland within the County of Lanark, has today a population of approximately 53,500. The eleventh (11th) and final Smoke Control Order became operative on 30 November, 1969.

Known as the "Iron Burgh" because of its many iron works and associated industries, it was at one time reputed to be the smokiest of all towns in Scotland. A private enactment permitted emissions from factory chimneys—Coatbridge Burgh Act, 1885:

**Section 88**—Nothing in this Act, or in the Public Health Acts, so far as the same relate to the burgh, shall be construed to extend to mines so as to interfere with or obstruct the efficient working of the same, nor to the smelting of ores and minerals, nor to the calcining, puddling, or rolling of iron or other metals, whether in their crude or manufactured state, nor to the conversion of pig iron into wrought iron, so as to obstruct or interfere with any of such processes respectively; Provided that nothing in this section contained shall extend to exempt the burgh from the provisions of subsection (i) of section 16 of the Public Health (Scotland) Act, 1867.

On the introduction of the Clean Air Act, 1956 the Town Council of Coatbridge considered very carefully all the aspects and implications involved before finally deciding to rid itself of a smoke polluted atmosphere. The first area began in a new housing scheme of 888 houses situated on the south side of the town adjoining the A8 motorway. As the prevailing wind is south-west and the scheme selected is situated on the boundary of the burgh this was considered to be an ideal site to begin with, and, progression of the "smoke controlled areas" continued with this point in mind. The procedure proved to be most effective, as most of the heavy industries are situated on the north and east side of the town. The appended statement gives the names of the Smoke Control Areas with the dates of operation.

A total of 14,107 houses along with many other premises is covered by the various orders. During the ten years activity in promoting smoke controlled areas, a total of 1,480 were exempted from the provisions of the Act, most of which have now been dealt with by closing orders and demolition orders in terms of the Housing (Scotland) Act, 1966.

With the same determination the Town Council pursued a vigorous housing programme, and this greatly assisted the promotion of clean air. All the new houses were made to comply, most being fitted with electricity, gas or central heating by means of oil. At the time of writing 1066 new houses are in the course of erection, and, these also are being made to comply with suitable heating arrangements.

# SMOKE CONTROL AREAS, COATBRIDGE

	Date of Operation	Houses	Halls	Churches	Commer- cial Premises	Factories	Offices	Schools	Shops	Hospi- tals	Clinics	Totals
1. Shawhead	1. 8.60	888	—	1	—	—	—	1	3	—	—	—
2. Kirkshaws	17. 8.64	1360	1	1	2	13	1	4	11	1	1	—
3. Kirkwood	19. 9.66	1768	1	2	1	1	1	3	14	—	1	—
4. Drumpellier & Blairhill	19. 9.66	2078	2	3	3	6	5	3	53	—	—	1
5. Rosehall	1.11.67	589	2	1	—	1	4	—	25	—	—	—
6. Townhead	24. 4.68	1550	—	2	1	1	—	4	6	1	1	—
7. Langloan	25. 9.68	558	1	5	7	8	16	3	63	—	—	1
8. Greenhill	25. 9.68	454	3	—	3	10	—	1	1	—	—	—
9. Greenend	31. 5.69	1233	1	—	1	7	—	1	8	—	—	—
10. Barrowfield	30. 9.69	2183	5	3	2	20	8	7	49	—	—	—
11. Cliftonville	30.11.69	1446	20	9	19	34	12	9	214	—	1	—
		14107	36	27	39	101	47	36	447	2	4	2

EXEMPTIONS 1480



As a result of the amalgamations within the British Iron and Steel Works all but a few of the many heavy industries have been dismantled. Coke ovens, a sinter plant, and smelting furnaces have all disappeared during the past three years. By contrast, there are now knitting factories, whisky bonding stores, light engineering shops and an engineering training school for apprentices, along with other smaller types of factories. On the ground of the biggest iron works now defunct, there is now Scotland's largest 'containerbase', which deals with overseas containers; and a further development is taking place to provide access for freightliners by rail.

A great deal more could be written about all the transactions that have taken place since the inception of the Clean Air Act. However, in closing this short narrative one must not forget the very able assistance and encouragement given by the officials of the National Coal Board, Electricity Board, Gas Board and voluntary organisations, Women's Advisory Council, Coal Utilisation Council and Coal Merchants Association. Finally the public themselves must be thanked for their whole-hearted support and ready welcome given to the promotion of clean air. One of the householders on being interviewed recently by the local press summed up in these words—"I was brought up in this house and helped my mother with the washing. It was heartbreaking to find the wash worse after, than when it was put out. The new smokeless zone ruling has been a fantastic difference. Even the children are a lot cleaner looking these days".

---

## **CLEAN AIR 70**

**The Southport Conference**

**will be opened by**

**The Earl of Bessborough**

**at 10.30 on Tuesday 20th October 1970**

# THE ASSAULT ON THE ENVIRONMENT

One of the earlier contributions to the European Conservation Year 1970, was the Association of Public Health Inspectors' Conference on the Assault on the environment, held on 21 January at Seymour Hall, London. This one day conference, was also the first of its kind to be held in the United Kingdom since the Prime Minister announced the setting up of the Royal Commission on environmental pollution.



Mr. E. W. Ward addressing the meeting on 21st January. On his left is Mr. Eldon Griffiths, M.P.

Lord Kennet, Parliamentary Secretary, Ministry of Housing and Local Government and Regional Planning, in opening the conference mentioned the rising tide of interest in the pollution of the environment. He said there was a new category of substances to be considered in the matter of pollution—those that were neither definitely harmless or definitely harmful. Eventually he thought, we should have to come to an understanding that there were these substances about which there was doubt and which would have to be treated as guilty until they were proven innocent. At the present time in this country there were 10 Ministers who had statutory powers over various forms of pollution. He looked forward to the Standing Royal Commission on the environment and the planned control unit which in future under Mr. Crosland, would co-ordinate all these statutory powers. Lord Kennet said in conclusion that we could look forward to an improvement in many or all sectors of pollution and also to a possible halt in pollution.



In his paper "Environmental Health Problems of Urban Areas", Mr. E. W. Ward (Chief Public Health Inspector, C.B., of Warrington), stressed the fact that an interdisciplinary approach was essential when dealing with the improvement of the environment. Environmental Planning and Urban Renewal demanded better co-operation between the professional disciplines than had been evident so far. There was an urgent need for greater adaptability of central and local government departments to the problem of planning the environment and preserving our natural resources. Mr. Ward gave the example the City of Liverpool where recently a non-medical director of environmental health had been appointed. After dealing with the general pollution of the environment, industrial effluents, pollution of the sea and solid wastes, Mr. Ward mentioned air pollution from road vehicles and described the considerable work that had been carried out in measuring the emissions from exhausts. "We know," he said, "that leaking exhaust pipes can allow dangerous levels to build up within a car and cause accidents. 38 per cent of drivers involved in accidents in Paris in one year had serious concentrations of carbon monoxide in their blood." The evidence was strong enough to warrant full scale investigation into the hazards, meanwhile it should be possible to deal with the nuisance aspect of motor vehicle exhausts.

Dealing with industrial air pollution, Mr. Ward said that air pollution rarely entered into the town planners' calculations. It was too often assumed that simply by introducing domestic smoke control the problem was solved, and it was becoming fashionable in some town planning circles to advocate a mix of industry, commercial and residential development in urban renewal areas. Mr. Ward had heard suggestions that no distinction should be made between the quality of the atmosphere where one worked and one lived, although he had noticed that people who expressed those views usually chose to live in a clean environment far away from industry.

Discussing pollution by sulphur dioxide, Mr. Ward said that the increasing use of heavy fuel oils with a high sulphur content had resulted in a steady increase in SO<sub>2</sub> emissions of the atmosphere. The present tax was 2.42 pence per gallon and it was estimated that the cost of reducing the sulphur content to 1 per cent by weight would be 0.75 pence per gallon. The government, thought Mr. Ward, could make a positive contribution to the clean air movement by reducing the tax on fuel oil by 3 farthings which would be the cost of reducing the sulphur content and at the same time to introduce legislation to limit the emissions to the atmosphere.

Speaking on domestic smoke control, Mr. Ward made the point that the industrial areas were falling behind in their progress. He mentioned a proposal that the wealthier residential areas in pleasure resorts should subsidize cost of smoke control in the industrial areas on the grounds these were the areas that provided Britain's wealth. This was a novel concept, but meanwhile many congested areas remained partially obscured by domestic smoke.

After covering the subject of noise, food inspection, and housing in

urban areas, Mr. Ward concluded with some words on environmental planning. He said: "The unplanned scrawl of towns and cities, the gross pollution of the environment, the extinction of many forms of life, the ignorance of man and the inadequacy of education place an impossible strain upon our resources. A major programme of renewal, involving the complete restructuring of our urban areas, is needed if overcrowding, squalor, pollution and destruction of the natural environment on a scale not yet witnessed are to be avoided."

In his paper "Environmental Health Problems in Rural Areas", Mr. J. L. Stringer (County Health Inspector, Hertfordshire County Council) dealt only briefly with the subject of air pollution. He said that there were, however, plenty of examples of pollution from rural sources. He knew of one rural area where several million tons of clay were extracted each year and made into bricks. This resulted in the emission of vast quantities of sulphur dioxide and of other gases, including fluorine and the fumes were noticeable over considerable distances, especially at times of temperature inversion. "While it may be difficult," said Mr. Stringer, "to show that any physical harm results from this air pollution, the psychological effect is depressing, and I have no doubt that the vegetation is affected. Other rural industries, such as ore smelting and cement making, as well as power stations, being dependent on the local availability of the raw material, may create problems confined entirely to rural areas." Mr. Stringer went on to say that grit and smoke from some of our large industrial cities could, under inversion conditions, give rise to smog and a reduction in sunlight far out into rural areas. Damage to vegetation impaired the absorption of carbon dioxide, itself a product of combustion.

"Another pollution problem," stated Mr. Stringer, "which again is more acute in built-up areas is that of fumes from motor vehicles burning petrol or diesel oil. These fumes can disperse far more quickly in open areas than they would in an urban locality, but it is depressing to find that many small country villages and towns still have main roads running through them, when in fact it would be far more satisfactory to by-pass the area completely."

Mr. Max Nicholson, author of "Environmental Revolution" opened the discussion and conveyed to the delegates greetings from the Countryside Conference 1970. He said that the United Kingdom was leading the world in the protection of the environment but that knowledge derived from science and technology, together with their underlying philosophies should be welded into the practical problems facing us. A belt of pollution between 40 and 60 degrees latitude was the beginning of a global envelope of airborne pollution. Pressure should be brought to bear to establish international standards and the whole working of the biosphere had to be looked at, with voluntary co-operation from all concerned.

Mr. Nicholson thought that not enough experiments were being followed through and that problems mentioned in the press were not sufficiently investigated. He considered that the enforcement of regulations was not strong enough either on the part of governments or international bodies. He called for a Chief Environmental Advisor who could liaise with appropriate bodies.



# interested in a Clean Air Campaign or house improvement scheme?



## EXHIBITION

A complete pre-fabricated and self-contained "Clean-Air" Exhibition; adaptable in size with one, two, three or four approved smokeless appliances under fire, and displays of the smokeless fuels available in the district; also a self-contained exhibition unit for use with House Improvement Schemes.

## MOBILE UNITS

Manned with technical demonstrators, to advise and help residents in proposed or newly-formed Smoke Control Areas. They incorporate approved appliances under fire and a display of the solid smokeless fuels.

## DISPLAYS

A range of portable units variously displaying instructional panels dealing with Clean Air and the Act, House Improvement Schemes, a typical central heating unit, fuel displays and literature displays

## LITERATURE

Informative literature is available free for Local Authorities to distribute to the public, explaining the Clean Air Act, and giving full information on solid smokeless fuels and the appliances.

these S.S.F.F. aids  
help to create the right  
Atmosphere

The comprehensive services offered free by the Solid Smokeless Fuels Federation can make an invaluable contribution to "Clean Air" campaigns, the implementation of Smoke Control Areas, and the organisation of House Improvement or Conversion schemes. Local Authorities who are interested in utilising the aids shown above are invited to apply to the address below.

**SOLID SMOKELESS FUELS FEDERATION**

York House . Empire Way . Wembley . Middx

# Clean air is automatic with clean electricity

*For clean air areas, the most natural choice is Electricity for space heating, water heating and air conditioning in home, industry and commercial buildings. Electricity is the only fuel that causes no combustion. It's always there to be switched on. Nothing to store. Nothing to dispose of.*

**Electric Central Heating.** Automatic, simple, cheaper to install than other systems. Runs on special low rates, and, of course, complies with Clean Air Act.

**Storage Radiators.** The most easily installed and practical system for existing property. Wide variety to choose from, including fan assisted models for greater flexibility and control.

**Electricaire.** Warm Air Central Heating by Electricity. Essentially a central sited storage heater, warm air through ducts—controllable room by room. Ideal for new property.

**Water Heating.** By Electricity, immersion heaters—wide range for home, office or factory. Negligible maintenance, easily installed and economical in use.

**Air Conditioning.** Gives maximum effect to controlling environmental conditions in offices, shops, hotels and public buildings.

## Better things are electric

*The Electricity Council, England & Wales*



# LETTERS

*The Editor*  
*Smokeless Air.*

Sir,

Following the making of two smoke control orders, the National Coal Board installed 320 "Housewarmers" in their houses in this District. The Housewarmer is a smoke reducing, down draught, solid fuel room heater using washed coal singles for fuel. The appliance is rated at 11,000 BTU's for radiation and warm air convection and 14,000 BTUs for hot water. Observations were taken and it was seen that whilst there was an improvement in smoke emissions there was still a large number of chimneys smoking. It was noticed that all of the chimneys smoked some of the time and the difference between these houses and those in a conventional smokeless zone is great. My Council complained about the smoke emissions and meetings have been held between the N.C.B., the Ministry of Housing and Local Government and the Carlton Health Department. Further observations are taking place.

A visit was made to a similar miners' estate where 360 of these appliances have been installed. There was a considerable amount of smoke and unless you were told it would be difficult to imagine that you were in a smokeless zone.

With the advent of cold weather complaints started to come in about the lack of heat from these appliances and these complaints are being followed up. Reports are being received of tenants having to install secondary heating to supplement the Housewarmer. As the glass door tends to soot up and stop radiant heat the door is opened to let the warmth into the room. This, in turn, is against the operating instructions and smoke is produced when fresh coal is added. In the kitchen the side oven range has been removed and a double radiator fitted. As tenants have pointed out, it is not possible to have both hot water and hot radiators so the kitchen is not as warm as it used to be.

At the last Council Meeting it was decided not to prosecute four occupiers of houses in other smokeless zones whilst the N.C.B. houses could produce as much smoke and be exempt. Complaints about the smoke have also been received from occupiers of houses in adjacent roads which are in a proposed smoke control area.

A survey has been made of all properties where the Housewarmer was installed. 78 per cent of the tenants returned the questionnaires which required only a Yes/No answer. The questions and replies are as follows:

	<i>Yes</i>	<i>No</i>	<i>Do not know</i>
(1) Do you find any difficulty in operating the appliance in accordance with the instructions supplied?	15.8	76.7	7.5

	<i>Yes</i>	<i>No</i>	<i>Do not know</i>
(2) Do you find that it provides adequate space heating?			
(a) in the lounge	15.7	84.3	
(b) in the kitchen	23.0	77.0	
(c) in the bedroom or lobby	28.5	71.5	
(3) Are you using any additional form of heating?			
(a) Electric, gas or paraffin heater	51.5	48.5	
(b) immersion heater	9.4	90.6	
(c) was it in use before the present installation?	13.2	86.8	
(4) Do you get sufficient domestic hot water?	53.5	43.7	1.0
(5) Can you get the radiators hot and at the same time sufficient domestic hot water?	22.6	76.4	1.0
(6) How many are in your household?		4.47 average	
(7) Any comments you wish to make.			

80.3 per cent gave comments which are too lengthy to include.

The appliance conforms to a 'Presumed Standard' No. 6434 (June 1969) but it is impossible to relate the standard to the appliance in a house. Should any member require any further information please contact me.

Yours faithfully,

G. B. STOKES,  
Public Health Inspector.

*Manor Road,  
Carlton, Nottingham.*

*The Editor,  
Smokeless Air*

Sir,

With reference to the report of the Symposium on Pollution from road vehicles on page 150 of your last issue, Mr. J. W. Furness is an engineer who understands the technical aspects of carbon monoxide emissions from petrol engined vehicles and smoke from diesel vehicles; but it would appear that it is the policy of his Ministry to block any reasonable attempts to reduce these two pollutants. At the end of the second paragraph on page 150, he is reported as indicating that the reduction of carbon monoxide by using improved carburettors or by fuel injection is costly. Admittedly, the word "costly" is a relative term but it is suggested here that the extra cost of about £10 per car for the former should be regarded as being quite reasonable; and the latter system is already standard on some popular sports cars. Thus, this argument is not a strong one.

Next, he claims that the British Standard for diesel engines is adequate to prevent diesel smoke but depends on the effort put into maintenance. Unfortunately this simply is not so. The standard is much too lax and engines set to it, particularly in the lower power range, are permitted to smoke by this "Standard".



In his final paragraph Mr. Furness is quoted as saying that nothing should be done by the British Motor Industry to reduce carbon monoxide emission because (a) it would add to the price and thus reduce our Export market; and (b) there are no direct medical grounds indicating serious health hazards.

These arguments are patently absurd. All our exports to America have to be fitted with devices far more expensive than those necessary for our home market, and the few extra pounds on our present basic export price is not likely to affect the market to any extent. With regard to (b) there may not be honest evidence that carbon monoxide at its present level is killing or maiming people, but there is evidence that it is likely to affect human speed of reaction—a most vital requirement in modern driving! In any case, a simple device for reducing carbon monoxide by up to two-thirds is a well worthwhile amenity advantage.

Mr. R. A. C. Fosberry puts in the argument that diesels will be improved when there are improved smoke meters available. This, of course, is utter nonsense, and is purely a delaying tactic.

It can be agreed that the Motor Industry will require two to three years to implement Ministry Regulations, but it should be added that this is the strongest possible argument for the Ministry to get cracking immediately.

Dr. Scorer puts the age-old suggestion that diesel exhausts should be emitted at high level rather than on to the road. This has been argued many times and it has generally been concluded that high emission is a disadvantage.

On the subject of taxi-cab exhausts, Dr. Scorer's observation that they are bad offenders is, of course, true. The reason is that the engine builders are permitted to set the engines to give that little extra power by using the smoke level permitted by the British Standard which, for doubtful reasons, is much too lenient to smaller engines.

Yours faithfully,

PHILIP DRAPER,

C.Eng., F.I.Mech.E., Inst.F.

*Shipstal Cottage,  
Arne.*

# REVIEWS

## **Clean Air—Law and Practice**

*J. F. Garner and R. K. Crow, 506 pages, Shaw & Sons Ltd., £5 5s.*

This book, now in its third edition, is one which should find a place in every Public Health Inspectors' Department library and should also prove invaluable to the student. It will also be a boon and provide clear and comprehensive details of procedures to be followed for those who have yet to make a start with smoke control areas.

The preface makes clear, if the title does not, that the authors' intention is to deal with the implementation and practical application of the provisions of the Clean Air Acts of 1956 and 1968 and the associated memoranda, Regulations and Orders. For those who, like the writer, have since the passing of the 1956 Act, relied on an ever expanding, and increasingly well thumbed file of H.M.S.O. publications, this concise yet comprehensive volume will provide a most welcome aide-memoire. For those whose files are not so well thumbed, it might appear as an oasis in the desert.

The book is very well indexed and cross-referenced and deals adequately with the relationship between the Clean Air Acts and the Alkali etc. Works Regulation Act and Orders. The text explains in sufficient detail matters which require explanation and the appendices include well annotated reprints of all the relevant Statutes, Regulations and Orders. The authors have wisely deferred publication until after the publication of Regulations empowered by the 1968 Act.

The chapter on the conduct of legal proceedings is, as would be expected, particularly well written. Much of the advice given is appropriate to proceedings under other legislation and provides a good model for those likely to be involved in either obtaining and submitting evidence, or the presentation of cases in the Magistrates' Court.

Errors are few and perhaps, therefore, more noticeable as minor sources of irritation, particularly those which stem from inadequate proof reading. One might prefer to read of a reduction in atmospheric pollution rather than "an improvement" in it. The "etc." might with advantage have been omitted from one of the author's qualifications! When referring to the provisions of Section 3 of the Act of 1968 the use of the word "with" instead of "without" in the following sentence "In addition, of the prohibiting the use of pulverized fuel in a furnace with approved grit arrestment . . ." caused one to read the sentence two or three times.

If the above is an indication of the magnitude of the criticisms that can be levelled, however, it must be quite a good book. It is.

*T. H. Iddison*



## **Annual Report of the Scientific Adviser to the Greater London Council, 1968**

This report by Dr. B. R. Brown, the Scientific Adviser to the Council, as ever makes very interesting reading. It has a very great scope and coverage. Moreover, it is written in a very interesting manner which makes even scientific statistics, at any rate, partly comprehensible to the layman. It is eminently readable.

Smokeless Air is, of course, chiefly interested in that portion of the report which deals with air pollution. It is therefore extremely gratifying to see that the third paragraph of Dr. Brown's introduction reads "It is pleasing to note that the improving condition of the air of London—at first a matter of dry statistics recording an annual decrease in the amount of smoke in the air as the clean air policy got underway—is now yielding benefits which are obvious to all who were familiar with the London of more than 12 years ago. The consistent clarity of the atmosphere in winter, the increase in winter sunshine, and the complete absence of smog for six years, are matters of common experience. Reports have been appearing of other natural phenomena which have followed as a consequence, in the fields of horticulture and ornithology: there is opportunity here to record the far reaching effects of a changing urban environment. There is also encouragement to London's administrators not to be deterred by the apparent magnitude of the task of grappling with other great problems of the environment."

Part three of the report deals with environmental studies and the first section is devoted to air pollution in some detail. Results obtained by volumetric instruments at seven representative sites in inner London indicated a continuing decline in the pollution of the air by smoke and sulphur dioxide. The average measured concentration of smoke in 1968 was estimated to be little more than 20 per cent of the level prior to the Clean Air Act of 1956. The level of sulphur dioxide was approximately 66 per cent of the pre 1956 level, and the record of smog free winters since 1962 remains unbroken.

Surveys of vehicle exhaust fumes have been carried out in a number of places, and the results make interesting reading. Although the report states that there have been no harmful effects to health in the country from normal exposure to traffic fumes in the open streets, traffic fumes are a frequent source of complaint. The report continues "A reasonable view to take at present is that traffic fumes be regarded as sufficiently detrimental to amenity to merit full consideration of such measures as can be economically undertaken to minimise them".—A view that the Society has been propounding for some time.

## **The District Heating Association Handbook 1969/70**

*The District Heating Association Ltd., Derbyshire House, St. Chad's Street, London, W.C.1, 211 pages, 1s. 6d. by post.*

The second edition of this handbook includes details of 20 district heating schemes in operation in this country. There are also a classified index which includes a list of the consulting engineer members of the association, and a classified trades list.

## **Principles and Practices of Incineration**

*Edited by R. C. Corey. John Wiley & Sons Ltd., 297 pages, 140s.*

The publication of a comprehensive technical book on the "Principles and Practices of Incineration" has been long overdue, and is therefore more readily appreciated by engineers involved in the design and manufacture of packaged type units ranging from 250 lb./hr. to 5,600 lb./hr.; and indeed, within this range suitable incinerators can be designed to incinerate not only normal municipality refuse but, the majority of problem materials generally associated with plastics, synthetic rubber and the numerous variables based on synthetic petroleum by-products.

All of the authors have covered their particular field in considerable detail, and the tabulation of approximate and ultimate analysis of the very wide range of waste materials is invaluable to the designer. In addition, the design data which has been accumulated from personal experience in dealing with various types of incinerators is extremely useful, as it is apparent a great deal of further research work must be carried out to design incinerators specifically to deal with synthetic waste products, and to ensure that sufficient flexibility is put into the plant to avoid necessity of continuous re-design to deal with various types of materials.

This publication is a considerable asset inasmuch as it brings before the designer experience based on the practicabilities of incineration, and not a hypothetical resumé based mainly on theory.

The basic combustion calculations given under the heading "Principles of Combustion" are quite clear and precise and deal with a considerable amount of variables. It is, however, essential that more research and development are carried out in this field as the burning characteristics of materials are affected by the weight to volume ratio, and can have a considerable bearing on the heat release within a given size combustion chamber.

This country, in common with many others, has appreciated the need for stricter control on the dissipation to the atmosphere of total solids and harmful gaseous mixtures; many alternatives are put forward in this book covering the cleaning and filtration of the products of combustion prior to emission to the atmosphere. Unfortunately, this type of equipment can be both complicated and expensive and calls for more research work to reduce the total contractual price of an incinerator plant.

The section dealing with on-site incineration of special industrial waste is most welcome, and it is pleasing to note the emphasis placed on waste heat recovery. There is no doubt that the economics are fully justified in coupling an incinerator to a waste heat recovery boiler; and indeed, providing the plant is in operation for 4,000 hours per year the additional contractual value in most instances pays for itself within 18 months. This type of installation, for the industrial section with a waste disposal problem, is more readily appreciated because of the return on initial expenditure.

While the emphasis at present is on the design and installation of large type incinerators, the local municipalities are invariably not in a position to accept the synthetic based types of materials and consequently the industrialist has to find his own salvation. It is within this sphere that this book is invaluable for record purposes, and in this respect, the authors and editor should be congratulated.

*R. Brett-Littlechild*



**Air Pollution. The Proceedings of the First European Congress on the Influence of Air Pollution on Plants and Animals, Wageningen 1968**

*Centre for Agricultural Publishing and Documentation Wageningen, 415 pages, D.fl42.50.*

Published in English, French and German this is a highly specialized, well illustrated book which reports the work of the European Symposium on the Influence of Air Pollution on Plants and Animals sponsored jointly by the Netherlands Government and the Council of Europe.

The report is in ten sections:—

1. Inventory of damage due to industrial and urban air pollution and research done in relation to this pollution.
2. Experimental research.
3. The effect of air pollution on plants.
4. The effect of air pollution on vascular plants.
5. The effects of air pollution on non vascular plants.
6. The effects of air pollution on animals.
7. Measuring air pollution in vascular plants.
8. Measuring air pollution in non vascular plants.
9. Resistance of plants to air pollution.
10. Shelter belts for air purification.

The book includes contributions from experts in their own field from all over Europe and it is pleasing to note that the United Kingdom was well represented. In section seven, Dr. Marjorie Clifton of Warren Spring Laboratory presents a comprehensive report on the National Survey in the United Kingdom.

Although this might be described as a book for the expert, it is an extremely useful book of reference to all those concerned with air pollution: it deserves a better index than that provided.

In conclusion, the report states that the following points call for closer international collaboration and international agreement—

International adoption of uniform units of measurement for concentrations and deposits of pollutants; standardization of the mathematical processing of large numbers of measurements made at a given place and of data on harmful effects, obtained from a series of experiments with variations in duration of exposure and in concentration of the pollutant; standardization of sampling and analyzing methods for the various pollutants; development of a system of warning against critical meteorological conditions; and the use of cryptogamous epiphytes for the detection of air pollution.

**How to Insulate Your Home**

*By A. J. Allsworth, published by Lomax Erskine Publications Ltd., 80 pages, 6s. post free.*

Although some £1,187 million is spent on keeping Britain's houses warm, a large proportion of this heat is wasted because of inadequate household insulation. Now, all relevant details on home insulation have been condensed into one book. The book contains a wealth of information and instruction on household insulation. It shows how even in a modern house, savings of at least 20 per cent can be made on fuel bills; and how, in older houses, this saving can be as much as 40 per cent.

The book is written in a simple, straightforward style and is well illustrated. The economics of insulation are discussed and it is made clear that even a fairly substantial outlay on full insulation will pay for itself in about five years. Draughts, how they are caused, where they occur and the various methods of stopping them are fully dealt with, and roof insulation and its benefits are discussed and a number of ways of carrying it out described. Wall insulation and alternatives are considered together with the forms of insulation for pipes and tanks. The last chapter of the book looks at double glazing systems, and sound advice is given on the selection of the correct type.

A brief mention of accoustic insulation is made and it is pointed out that many of the methods used for thermal insulation are also effective against noise. All in all, this book is a practical guide for the householder with moderate skill and modest means.

### **The Insulation Hand Book 1969/70 Metric Edition**

*Edited by A. J. Allsworth, Lomax Erskine Publications Ltd., 305 pages, 15s. post free.*

This new edition of the hand-book marks an important step, which the whole of the insulation industry will be facing in the next few years, namely the changeover to metric (S.I.) units. This edition sets the pace for the "changeover" and provides data in a form which will accustom the producers and consumers of insulation materials to use the new language, which will soon be mandatory.

The main contents include tables giving the dimensions and insulation values of all important thermal accoustic and vibrating insulating materials, fixing systems and adhesives, legal requirements about insulation and a list of relevant associations and institutions. An alphabetical list containing the names and addresses of approximately 800 insulation manufacturers and contractors is also given.

This is an extremely handy little volume which contains a mass of information presented in a very acceptable form.

### **Clean Air Measurement goes Metric**

Four important tools in the implementation of of the Clean Air Act are the British Standards specifications for smoke alarms and the use of smoke charts. To facilitate their use during the coming period of metrication they have been issued now in metric editions. The standards are:

B.S. 2740: 1969—Simple Smoke Alarms and Alarm Metering devices.

B.S. 2741: 1969—Recommendations for the construction of simple smoke viewers.

B.S. 2742: 1969—Use of Ringlemann and miniature smoke charts.

B.S. 2811: 1969—Smoke density indicators and recorders.

All these deal with the measurement of smoke, particularly that emitted from chimneys of industrial establishments.

These standards are available from the B.S.I. Sales Branch at 101/113 Pentonville Road, London, N.1. Prices are as follows:

B.S. 2742—6s. 0d.

B.S. 2740 &

B.S. 2811—10s. 0d. each

B.S. 2741—8s. 0d.



## **The Warwickshire Clean Air Council, 12th Annual Report 1968**

Apart from an interesting history of the Warwickshire Clean Air Council by Messrs. Allen & Crow, the main point made by this report is the work which the Council have been undertaking in connection with pollution from road vehicles. The Council are unanimous in their view that road vehicle pollution is a matter of concern and are of the opinion that there is insufficient concern at government and ministerial level. In spite of the lack of definite evidence of effect on health, the Council feels that this is a strong possibility which should always be borne in mind, and in any case, agree with the views of the Society that exhaust fumes, both diesel and petrol should be dealt with for amenity reasons, regardless of the necessity of proving health dangers.

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## **SULPHUR DIOXIDE DAMAGE TO ANTIQUITIES**

We are reprinting below a letter published in "Atmospheric Environment" (Vol. 3, 1969) which will also be of considerable interest to readers of "Smokeless Air":

The article by Spedding on "The Fate of Sulphur-35/Sulphur Dioxide released in a Laboratory" (1969) is of considerable interest to those of us working on the conservation of antiquities, and I would like to comment on two points.

First, about half the total labelled sulphur dioxide was found on the damp ceiling. Sulphur dioxide is today causing inestimable damage to frescoes, particularly in Italy. The true fresco is composed of pigmented lime plaster, which may be converted by sulphur dioxide to gypsum, doubling its volume and loosing its coherence in the process. SAYRE and MAJEWSKI (1963) examined the damage to the famous Giotto frescoes in the Scrovegni Chapel at Padua, using X-ray diffraction. They found "That the extent of decay is considerably greater where water seepage has occurred than in regions that have remained dry."

Second, it may be that in fairly modern houses sulphur dioxide concentration is reduced to about 20 per cent of the exterior level, but histograms of daily average sulphur dioxide over a period at the Victoria & Albert Museum, London (Padfield, 1966) indicate that in buildings with older plaster the figure may be much nearer 40 per cent. Certainly there is no doubt of the menace of sulphur dioxide to the textiles, tapestries and documents in such museums.

The hazard of sulphur dioxide to human beings is by now well known. Its damage to antiquities in the industrial parts of the world is today so appalling that it is to be hoped that governments, for both these reasons, may find ways to reduce sulphur dioxide concentrations by legislation whether or not the processes used for sulphur recovery can be made to yield a profit.

*Garry Thomson*

*Scientific Adviser,  
National Gallery, London W.C.2.*

# INTERNATIONAL NEWS

## U.S.A.

### **Carbon Monoxide Research**

A National Research Council Committee that has reviewed the health aspects of carbon monoxide has concluded that the facts must be firmly established by additional research before safe carbon monoxide standards can be set. The Committee found that, since there is no level of carbon monoxide in ambient air that is known to be without effects, it is important to minimize exposure to CO. On the other hand, the study uncovered no evidence for the contention that urban air pollution produces any chronic health effects specific to CO. However, the report notes that recent experiments show that CO exposure results in some impairments of mental functions, particularly in judgement of timing; this may be a plausible explanation for some automobile accidents.

### **Stringent Sulphur Regulations in New Jersey, U.S.A.**

In a paper presented at the Technicon Symposium in London on 19 November, 1969, Mr. R. S. Yunghans, discussed the strict regulations on the content of sulphur dioxide in fuels in New Jersey. These rules were being enforced and were very effective. The regulations will become finally effective on 1 October, 1971. Sulphur contents standards for 1971 are as follows:

#### *Oil*

0.3 % S—heavy

0.3 % S—medium

0.2 % S—light

#### *Coal*

Sale or use of coal with more than 0.2 per cent S prohibited unless (a) emissions can be controlled, (b) large consumers in existence before 6 May, 1968, can justify less restrictive sulphur percentages.

## EUROPE

### **European Conservation Conference**

On 10 February, 1970, the European Conservation Conference in Strasbourg was presented with a report from Prof. R. Passino, Director of the Rome Institute for Water Research. Professor Passino's report showed that industrialization had affected man's environment "in its totality—soil, ground cover, animal life, water and the atmosphere". He emphasized, however that only 20-30 per cent of changes in the environment resulted from



pollution from industrial plants. Urban complexes, motor vehicles, and other forms of transport presented far more serious sources of pollution. Motor vehicles alone, Professor Passino said, accounted for 60 per cent of atmospheric pollution. Among the remedies proposed were the compilation of an international charter for the defence of nature and the establishment of an information centre to help to co-ordinate research and legislation.

Dr. Michael Maldagu, Lecturer at Laval University, Quebec, presented a report which dealt with the problems raised by agriculture and forests. Dr. Maldagu also advocated the setting up of a European Centre for co-operation, co-ordination and guidance for the planning of the use of the environment.

## SWEDEN

### **The Gothenburg Air Pollution Study 1949 to 1964**

We have received a copy of the above study which reports on the results of a general air pollution survey that was undertaken in Gothenburg between 1959 and 1962. During that period deposited matter, sulphur dioxide and smoke had been measured and the results of these measurements are published together with recommendations. Between 1962 and 1964 special pollution measurements were also taken in Gothenburg, including measurements of carbon monoxide. Recommendations relating to the latter are of some interest: "As the carbon monoxide has to be considered as an index of air pollution from vehicle exhaust containing many substances which influence man, it is recommended that one-hour mean of 20 p.p.m. (measured 150 cm above ground level) is set as the highest tolerable concentration. Where this value is exceeded, which can be expected in the city centre, the traffic flow has to be changed in order to lower the concentration." It is suggested that future planning of the city should be undertaken in such a way that the maximum one-hour mean could be kept considerably below 20 p.p.m.

## GERMANY

### **Düsseldorf Clean Air Congress 14-16 October 1969**

The theme of the Congress at which 48 papers were presented, was "Actual Ways Towards Cleaner Air". After an introduction by Herr H. Stephany, the European co-operation in air pollution control was outlined by H. Oels. He listed the various interests of international organizations as follows: World Health Organization: collects knowledge about the effects of air pollution on man, animal and plant; The World Meteorological Organization: ascertains the influence of weather and climate on air pollution; the Economic Commission for Europe: investigates the economic problems arising in connection with air pollution control—a initiative is being taken in establishing uniform regulations for the properties of exhaust gases emitted from motor vehicles; the Organization for Economic Co-operation and Development: deals with questions in the field of research and measurement of air pollution. The European Communities are striving to harmonize the statutory regulations of the

member states in connection with air pollution. Prof. Dr. H. J. Martini (Hanover) in his paper on the "Formation Occurrence, Mining of fossil Fuels and their Economic Significance", gave a comprehensive survey of the raw materials which, after being processed, eventually lead to air pollution. By means of photos and statistics, the author showed that the energy demands in the foreseeable future could be satisfied.

K. Belke was the first contributor in the group "A" of papers with "Air Pollution and Road Traffic—a General Survey with Special Reference to Legislation in the Field of Automotive Engineering". He discussed the effectiveness of the emission limit regulations for exhaust gases. K. Lohner gave a paper entitled "Technical Possibilities of Reducing Undesirable Components of Motor Vehicle Exhaust Gases from Existing Automotive Systems" and concluded that hydrocarbons and oxidized hydrocarbons could be reduced to small amounts by proper combustion control; the odour however, was still a problem. Soot could be largely avoided but there were still difficulties regarding nitrogen oxide which was formed at high temperatures during combustion and for which a satisfactory solution did not yet exist. There was not enough evidence from research regarding the danger of lead content. In a paper "Emissions from LP-gas Powered Automobiles" by M. Krugel, experiments were described with a motor vehicle which could be driven alternatively by liquid bottled gas and liquid fuel. Carbon monoxide, hydrocarbons and nitrous oxides were measured in these experiments. It was found that the operation with fluid gas and partial load adjustment brought a considerable reduction of carbon monoxide and nitrous oxide emission, but no reduction of hydrocarbon emission. At the moment, because of high fuel costs, only fork lifts were driven by fluid gas in the Federal Republic of Germany.

The next group of papers "B" dealt with the problem of reducing the sulphur content of flue gases. N. Lowicki described the "Drillo-ATS" process which is based on chemisorption. This process uses oxide-compounds of alkaline-earth metal and amphoteric heavy metals absorption. K. Knoblauch gave an account of the Bergbauforschung process, which is based on the principle that  $\text{SO}_2$  is adsorbed on special carbons at temperatures above  $100^\circ\text{C}$ . together with oxygen and steam in the flue gases, and converted into sulphuric acid. The paper gives important data of the two test plants and the results obtained during tests covering a period of 18 months. On grounds of these results, the author studies the question of the applicability of this process in big power plants, taking as the basis the costs and the profits which could be made by processing the regeneration products. The Bischoff process discussed by G. Hausberg, represented an adjustable mechanical extraction by using alkaline additives where dust and  $\text{SO}_2$  extraction was combined. Since 1968 tests had been run at a German power station and the measurement results showed that dust and sulphur dioxide could be economically eliminated at the same time. " $\text{SO}_2$  removal by Sulfacid Process Equipment" described in a paper by O. G pner, worked on the principle of the wet adsorption catalysis. A gas to be cleaned passed through a resting carbon layer of high catalytic activity and developing sulphuric acid was washed off in 10-15 per cent concentration, together with injected water. Investigations were still under way in an important pilot plant with the object of finding out whether the residual



dust contained in the boiler waste gas after the electro-precipitator might affect the efficiency of the catalyzer.

The "C" group of papers which followed, dealt with ground level concentrations, heights of chimneys and atmospheric diffusion calculations. Dr. K. Gräfe's paper on "Sulphur Dioxide Measurement on Water Surfaces and Buildings as an Aid for Atmospheric Diffusion Calculation", compared SO<sub>2</sub> measurements with diffusion calculations and with grid measurements. He showed SO<sub>2</sub> concentration at various heights and the results of measurements taken from a launch on the River Elbe. By means of continuous SO<sub>2</sub> measurements, it was possible to place the emission sources and to build SO<sub>2</sub> wind-roses which, by giving a year-long information about frequencies of wind direction enabled decisions to be taken regarding town planning measures.

Mr. F. E. Ireland, the Chief Alkali Inspector for England and Wales gave a paper on "The Determination of Chimney Heights in Britain". He outlined the British legislation authorizing the heights of chimneys and emphasized the difficulties in relying on formulae to calculate chimney heights, especially in relation to the use of sulphur dioxide as a yardstick for a complicated mixture of products of combustion of solid and liquid fuels. Pure experience had to be the final factor in arriving at decisions.

Among the next group of papers "D" which dealt with various forms of pollution measurements, of particular interest was a paper by Schonbeck *et alii* on "Biotests of Air Pollutants". This report was mainly concerned with plants which reacted to the impact of pollutants in various ways which became apparent both in physical and in physiological changes. Thus plants could be used for the assessment of air pollution. The degree of air pollution however, could be measured only by the use of those plants which had been grown under standardized conditions.

The group "E" of papers dealt with pollution problems in various industries such as coking plants, viscose industry, smelters, refineries and steel-making processes. There were also some papers on the reduction of odour nuisances and attempts at odour control in the food industry.

In the last group of papers, Mr. A. Archer, Chief Health Inspector of Halesowen, presented a paper on the administrative and technical approach to air pollution in the United Kingdom. He dealt with both domestic and industrial air pollution and outlined the responsibilities of a Public Health Inspector on the one hand and the Alkali Inspector on the other.

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# News from the Divisions

## Yorkshire

The Divisional Council met at the Eggborough Power Station on Tuesday, 30 September, 1969. Following the business meeting, Mr. Watts addressed the Council and said that the afternoon would be spent touring the Power Station. In the morning he drew attention to the importance of the Electricity Industry to the Coal Producing Areas and the attention which was given to smoke control.

A display showed photographs of a modern power station and a table of figures showing coal customers in millions of tons.

### Coal for Electricity Generation

	1960	1968
C.E.G.B. and Scottish Boards	51.9 m. tons	73.2 m. tons
Per cent of total consumption	27 per cent	44.5 per cent
No. of Steam Stations	202	163
Installed capacity	28.151 m.w.	38.857 m.w.
Cost of coal and coke m. £	204.7	334.6

During his talk, Mr. Watts produced tables of information obtained from the "Statistical Digest" of the Ministry of Power. It was interesting that despite the great increase in central heating and the increase in the number of homes, the total heat input to the domestic market had remained virtually constant (14,422 m. therms in 1960 against 14,469 m. therms in 1968).

### Electricity Consumption by Users Energy supplied in millions of therms

	1960	1968
<i>Coal</i>	23,431	13,613
Percentage of total	46 per cent	24.5 per cent
<i>Electricity</i>	3,372	5,826
Percentage of total	6.7 per cent	10.5 per cent
<i>Coal</i>		
Domestic use	10,000	6,584
Percentage of total Domestic	69 per cent	45.4 per cent
<i>Electricity</i>	1,149	2,277
Percentage of total Domestic	8 per cent	15.6 per cent

The increase in consumption of coal through thermal power stations was of great importance in the campaign for clean air. This was being attained through a reduced number of power stations burning coal under closely controlled conditions providing an increased supply of electricity.



According to the Annual Report of the Alkali Inspectors, the electricity industry spent more on smoke control than any other industrial grouping—smoke control equipment cost £4,000,000 for a 2,000 M.W. station. The full advantage of burning fuel under such closely controlled conditions could only be realised, however, if the use of electricity continued to grow. Fortunately equipment was of heat supplied which was comparable with any fuel.

(1) *High Capacity Radiators*

Compared with normal storage radiators, these had a thicker layer of insulation than in the type formerly used which had the effect of not emitting excessive radiation in the early stages of storage but retained heat throughout the following day. Types now include a natural air flow through the block with damper arrangement to control output further.

(2) *Electric Ceiling Heating*

This was particularly suitable in highly insulated buildings and for short term use where a quick response was required such as in students' flats. The extra cost on the Domestic tariff was offset by the immediate response and close control which was possible.

(3) *Electricaire Warm Air Central Heating*

The heat storage principle was used with heating elements embedded in a storage material contained in an insulated unit. Output was controlled by a fan with ducting to carry warm air to the various rooms. The unit had to be carefully sited to reduce the cost of ducts. Production models were on field trial of a new device which used the storage part of an Electricaire unit but instead of blowing out warm air, the storage heat was used to supply a heat exchanger to a hot water system. Thus cheap stored heat could be used to feed a conventional radiator system. It was hoped these would be generally available in 1970.

Mr. Watts showed a table of capital and running costs for a semi-detached house based on 900 sq. ft. for different types of electric heating:—

*Floor Warming*

Capital cost	£135	} Using Y.E.B. tariff giving 15½ hours availability per day: 0·9d. per unit.
Running cost per annum	£57	

*Electricaire*

	<i>8 hr. charge (0·7d./unit)</i>	<i>11 hr. charge (0·7d./unit)</i>
Capital cost	£198	£170
Running cost per annum	£ 35	£ 40
(These figures assume an average occupancy—continuous use could somewhat increase running costs.)		

### *High Capacity Storage Radiators*

Capital cost	£170	} Using Y.E.B. tariff giving 8 hour availability 0.7d./unit.
Running cost per annum	£55	

The Electricity Board were introducing a scheme which offered the possibility of a home with electric central heating and water heating at lower costs by using the "White Meter" tariff. This used a two rate meter with two registers which were connected to a time switch. It recorded the electricity used at one rate during the day (in Y.E.B. 1.82d. per unit) and at a much cheaper rate at night—from 11 p.m. to 7 a.m. (in Y.E.B. 0.7d. per unit). This covered everything electric in the home. Electric central heating could be run entirely on the cheap night rate. High capacity storage radiators and other storage devices which built up all their heat at night and did not require a charge during the day, were equally suitable for use on the White meter as they were on the lowest of low Y.E.B. off-peak rates. Most of the water could be heated by electricity at the cheap night rate tariff. With the new White meter you could set the automatic time control on the cooker to prepare casseroles and other slow-cooking dishes overnight at really low cost. An automatic washing machine or dishwasher could be started to do a cheap late-night wash. About one-third of the running costs of a refrigerator or deep-freezer would be on the cheap rate. All these benefits could be done with the minimum amount of conversion. Apart from special circuits or controls for storage radiators and water-heating system everything else hugged in and switched on as usual.

It was likely that any future tariff changes would increase the attractiveness of the night only off-peak tariffs and the "White Meter" tariff. Experiments were proceeding to supplement floor warming to make it possible to take advantage of the low capital cost of installation, but at the same time use the lowest tariffs.

Lastly, it was pointed out that electricity was the only fuel to offer fumeless, as well as smokeless energy at the customers' premises at low capital and running costs.

Mr. Wolforth of the C.E.G.B. said he wished to enlarge on certain aspects with particular reference to the power stations which had not been dealt with in Mr. Watts's talk.

He listed four power stations which collectively produced about 7,000 megawatts—Thorpe Marsh 1,100 Ferrybridge "C" 2,200, Eggborough 2,000 and Drax 2,000. These stations would consume approximately 20 million tons of coal annually to produce that amount of electricity and the dust arrestment plants were designed to handle some 4 million tons of dust.

There was no sulphur dioxide removal process but the tall chimneys would discharge at such a height as to adequately dissipate the products of combustion, including sulphur dioxide. Eggborough Power Station chimney was 650 ft. high with four separate flues with an efflux velocity of 75 ft. per second.



The dust arresting plant which combined mechanical and electro-static precipitators would have an overall efficiency of 99.3 per cent. The boiler plant would operate at 88 per cent efficiency whilst station efficiency was expected to be 37 per cent.

In answer to questions, Mr. Wolforth said that before Eggborough was constructed an air pollution survey had been carried out since 1964 and this survey was still continuing with the station in operation. The instruments for measuring sulphur dioxide and smoke were stationed in small out-buildings set around the station. A research programme was also being carried out to assess plume and sulphur dioxide dispersion. Records were taken at three-minute intervals on the punched tape which was relayed through the G.P.O. telephone system. This would be seen during the afternoon tour of the Power Station.

After luncheon provided by C.E.G.B., a tour of the station conducted by a number of guides was made. Everyone was impressed by the size of the boiler generating plant and the cleanliness of the station, in spite of the fact that workmen were still employed finishing off the construction and painting the equipment.

The control room was set out on the most modern lines, control of each 'set' being arranged in each of the four corners with central control from a desk in the middle of the room. The tour included a sight of the "merry-go-round" system of coal delivery where specially designed waggons of 26 and 33 tons capacity discharged coal into hoppers whilst in motion.

Finally the outbuilding containing the computer receiving three-minute measurements from the 28 atmospheric pollution recording stations was visited.

The meeting closed at approximately 4 p.m. with a cup of tea.

*J. Goodfellow, Ass. Secretary*

## West Midlands

A cold, bright autumn day marked the sessional meeting of the Division held at Leicester on Wednesday, 26 November, 1969, at the kind invitation of the National Coal Board. The party was greeted at the Snibston Colliery Welfare Centre by Mr. Dulson, National Coal Board, who described briefly the principles of district heating and welcomed members to Rowlatts Hill District Heating Scheme.

After taking coffee the party retired to the projection hall where excellent colour film presentations of district heating schemes were made. Mr. Lonsdale, National Coal Board, and Mr. Gregson, Assistant Housing Manager, Leicester Corporation, answered members' questions in a most erudite and informative manner arousing considerable interest not only in overall planning which must necessarily precede such projects, that also in the financial considerations, which are many.

Members were then provided with a buffet luncheon in the Welfare Lounge after which they boarded a coach for the short journey to Rowlatts Hill where Mr. Lonsdale and Mr. Gregson provided more than a conducted tour of the heating unit for Mr. Gregson described to the technically curious the operation of the boiler plant which is so unobtrusively sited at the base of one of the two high rise development buildings. To those especially interested in the planning and financial and environmental aspects of the scheme a very clear résumé was given of events from first exploration of the idea of district heating to the fruition of the project as now realised in the Rowlatts Hill development.

Altogether 507 dwellings are served by the submerged hot water generating plant (which provides a standard of comfort which easily measures up to Parker Morris Standards) consisting of 262 flats in multi-storey construction and the remainder in low rise blocks and bungalows.

Community centre, shopping precinct and other public amenities are provided and blended into the scheme in a most attractive way and members were all agreed that the visit was well worth making.

Returning to Snibston the party had tea, again provided by the Board, and the Chairman of the Division, Alderman Parkin, proposed a vote of thanks to our hosts, to which Mr. Lonsdale suitably responded and he expressed regret that Divisional Secretary, Mr. Kay, was not able to be with the party.

Members sent a greeting to Mr. Kay with their best wishes for a speedy recovery from his painful accident.

Twenty-one members attended.

*N. A. Garner, for Hon. Secretary*



The party from the West Midlands at Rowlatt's Hill



# **CLEAN AIR 70**

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## **ANNUAL CLEAN AIR CONFERENCE AND EXHIBITION**

**THE FLORAL HALL, SOUTHPORT  
20-23 OCTOBER, 1970**

---

**Conference Subjects include :-**

**The Working of the 1968 Clean Air Act, Grit and Dust Measurement, Waste Disposal and Incineration, Pollution from Road Vehicles.**

**Exhibition showing the latest Developments in Fuels, Appliances, Heating Systems, Instrumentation, and Control Equipment for the Prevention of Air Pollution.**

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SMOKE CONTROL PROBLEMS

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## North East

A meeting of the North-East Divisional Council was held on the afternoon of 1 December, 1969, in the Department of Civil Engineering, University of Newcastle upon Tyne. A total of 39 members signed the attendance register before the Chairman, Alderman B. N. Young, O.B.E., welcomed members and explained the need for a greater knowledge and awareness of the importance of grit and dust arrestation when considering the general question of air pollution prevention. In this connection the Chairman called upon Mr. W. Short, B.Sc., M.Inst.F., A.M.I.H.V.E., M.I. Nuclear E., Area Manager, North West Area, National Industrial Fuel Efficiency Service, to deliver a paper entitled "Grit and Dust—Measurement and Control. The Role of the Local Authority".

Mr. Short in his opening remarks outlined the major changes brought about by the Clean Air Act of 1968 and discussed some of the problems associated with the exemptions relating to Section 1 of the Act. With the aid of projected slides showing graphs, drawings and photographs he outlined the various methods of grit and dust arrestation both in Britain and on the Continent and he made special reference to the exemptions provided by the Clean Air (Arrestment Plant) (Exemptions) Regulations, 1969. Mr. Short continued by dealing with the fallout of particulate material of different sizes from chimneys of varying heights and he concluded by referring briefly to the problems of grit and dust measurement and the standards which the Minister might include in regulations to be made in the early future.

Mr. Short's address was followed by a lively discussion in which several members took part and it was clearly indicated that the prevention of grit and dust emissions was a matter which concerned all present. A vote of thanks to the speaker was proposed by Mr. A. R. Metcalf, Chief Public Health Inspector of Tynemouth C.B., and the Chairman closed the meeting by expressing appreciation to Professor Isaac and his staff for making the arrangements for the meeting and for the provision of light refreshments before members dispersed.

*L. Mair, Hon. Secretary*

## South West

On 4 December, 1969, a meeting of the South-West Division was held at Yeovil, Somerset. The Divisional Council met in the morning in the Council Chamber of Yeovil Borough Council, and there was considerable discussion on the question of the supply of solid smokeless fuels in the Region. However, the Regional Officer of the Solid Smokeless Fuels Federation was able to reassure members that although there might be a shortage of certain specific types of solid smokeless fuels in severe weather, the overall supplies would be adequate to meet the demand. It would seem that we in the South West are fortunate and are not as seriously affected as our colleagues in some other divisions.

The afternoon meeting was devoted to district heating, and a most interesting paper on the subject was presented by Mr. R. Uden, Area Manager, Domestic, Shell-Mex & B.P. Ltd., and Mr. R. J. Staley, District Heating Negotiator, Shell-Mex & Ltd. Following the paper, members were taken to the Summerhard Estate in the village of South Petherton, this development being served by a district heating installation. This is a private estate and when fully developed there will be a total of 68 dwellings ranging from two-bedroom bungalows to four-bedroom detached houses, all served by district heating. The central boiler house contains two Hoval boilers each rated at 1,600,000 Btu's/hr., and fired with 35 sec. gas oil. Members were able to inspect dwellings under construction and see at the same time the method of insulating the heating mains. A fixed charge is levied by the heating company on each householder according to the type of dwelling occupied.

After the visit, members were entertained to an excellent tea provided by Shell-Mex & B.P. Ltd. Alderman C. Hebblethwaite, C.B.E., the Chairman of the South-West Division, expressed the Division's appreciation of the excellent paper and visit, and also for the hospitality provided by the company.

A meeting of the Northern Area Committee was held on 14 January, 1970, in the Council Chamber of the Thornbury R.D.C. The whole question of whether it should be a function of the Committee to establish a liaison committee with the various industries contained in the Severnside complex was discussed, and consideration was also given to the best way of organizing such a committee. After much discussion, it was decided to call a further meeting and to invite representatives of the industries concerned, the C.E.G.B. and representatives of the three planning authorities involved.

*G. J. Creech, Hon. Secretary*

## Air Pollution Abstracts

**1161. Reflex Effect of Subliminal Concentrations of Sulfur Dioxide in Conjunction with Phenol and Carbon Monoxide in Air.** Elfimova, E. V. and Khachatryan, M. Kh. (Hygiene and Sanitation, 33. Nos. 10-12. Oct.-Dec., 1968. 161-164). Features specific to the joint reflex effect of a mixture of three gases (sulphurous anhydride, phenol and carbon monoxide) were studied under experimental conditions by means of electroencephalographic recording of the mutual action of conditional and non-conditional irritants. The finding was that the joint reflex action of the mixture of three gases at subthreshold concentrations proceeded as a summation effect.

**1162. Air Pollution on the grounds of a Modern Oil Refinery.** Polyanskii, V. A., Musserskaya, A. N. and Nesterova, N. E. (Hygiene and Sanitation, 33. No. 10-12. Oct.-Dec., 1968. 186-190). At modern oil-refining plants numerous sources of gas discharge are distributed at different levels and provide diffused atmospheric pollution of all of the plant's site at various distances from 1.5 to 60 m. The atmosphere on the territory of an oil-refining plant may be polluted with a number of noxious substances such as hydrocarbons, unlimited hydrocarbons, benzol, phenol, hydrogen sulfide, carbon monoxide and sulphurous gas. In order to provide pure supply of air for



ventilation it is necessary to improve the atmosphere on the territory of oil-refineries by means of introducing such technical measures as pressurizing of certain processes, complete elimination and decontamination of all organized and non-organized discharges, as well as rational designing of certain units on the plants site.

**1163. Vehicle Emissions vs. Fuel Composition.** Stone, R. K. and Eccleston, B. H. (Amer. Pet. Inst. Proc. Div. of Refining, 1968, 705-747). The American Petroleum Institute in co-operation with the U.S. Bureau of Mines has studied the effects of front-end volatility and fuel composition on vehicle emissions including both exhaust and evaporation losses. The amount and the photochemical reactivity of hydrocarbon emissions were considered along with carbon monoxide, oxides of nitrogen and aldehydes.

This report covers results on eight 1966 model cars. Additional 1966 and 1968 model vehicles are currently under test in a second phase of the programme. Testing covers an ambient temperature range of 20 to 95 F; driving cycle and instrumentation typical of current practices for emissions studies were used.

Test results showed that at high ambient temperatures, a large reduction in evaporation losses accompanied a reduction in front-end fuel volatility. However, there was also a small adverse effect on exhaust emissions from volatility reduction. Reactive hydrocarbon emissions from evaporation were reduced substantially by either volatility reduction or saturation of light olefins. Light olefin reduction also reduced exhaust reactivity. Carbon monoxide emission showed a small increase as fuel volatility was reduced; while nitrogen oxides and aldehydes showed no significant fuel effect.

**1164. How Sweden Attacks the Auto Exhaust Problems.** Mörstedt, S. and Wale, N. (Motor Vehicle Exhaust Research Project, 1969, AB Atomenergi, Fack, S-611 01 Nyköping 1, Sweden). A committee appointed in 1965 by the Swedish Ministry of Transport has proposed several measures in the fight for cleaner air. Since 1966 a working group under his committee has carried

out auto exhaust investigations and has also made ambient air studies. The committee has taken an active part in the work within the United Nations' Economic Commission for Europe (ECE) to develop European test procedures. The Swedish authorities have on the basis of the committee's proposals issued regulations which stipulate: closed crankcase ventilation from model year 1969, stricter limits for diesel smoke from 1 July, 1970. A limit for carbon monoxide for in-service vehicles with the engine idling has also been proposed by the committee. This report contains also a comparison of the results from ECE and USA gasoline vehicles exhaust tests.

**1165. The Acidity and the Concentration of Sulphate in Precipitation over Europe.** Persson, G. (Dec. 1968. Statens Naturvårdsverk, The Swedish National Nature Conservancy Office, Air Quality Department, Fack, 171 20 Solna 1). The long term trends of the acidity and the concentration of sulphate in precipitation over European stations—most of them located in rural districts—have been studied within the atmospheric chemistry network. There has been an overall increase in the acidity of precipitation in Scandinavia and Central Europe. For Great Britain and Ireland, however, no such trend can be seen. As regards the concentration of sulphate in precipitation the picture is much the same.

**1166. Sheffield—Europe's Cleanest City.** Batey, J. W. (Oct. 1969. "Build International", 2 (8), 20-22, publ. CIB, Weena 700, Rotterdam). The author discusses the historical background of the campaign against air pollution in Sheffield. A method of measuring the amount of smoke particles and sulphur dioxide in the air using a sampling gauge is outlined. The figures obtained using this technique between 1956-67 show that there has been a vast improvement over the period, and the author points out that this improvement is largely due to the modernisation of industrial processes. Methods of coping with the problem of air pollution from houses built close together are also examined.

**1167. Significance of Sulphur Studies on Environmental Health.** Davis, K. (1968 Proc. American Petroleum Institute, Div. of Refining, **48**, 591-610). The effect of sulphur compounds in the atmosphere on the health of society has been a subject which has received extensive study during the past several years by the medical profession. According to the literature in 1880 the sulphur dioxide content of the air in London was responsible for some 1000 deaths. Similar references have been made to the effect of increased sulphur dioxide content on mortality on at least nine other occasions when inversions occurred over such cities as London, Meuse Valley, Donora, and New York City. The most recent incidents that have caused concern occurred during the 1966 Thanksgiving holiday on the American east coast, with New York and Philadelphia reporting sulphur dioxide values as high as 1.0 ppm.

**1168. Clean Air Maintenance in the Non-ferrous Metal Industry. Part 3. (In German).** Knapp, W. (Feb. 1969. "Metall" (Germany) **23** (2), 183-189). The characteristics, operation and applications are described of devices used for the removal of dust from exhaust gases and fumes in the non-ferrous industry. Both dry and wet methods of precipitation are discussed. Dry systems include mechanical collectors, electrical precipitators and fabric filters. References are made to the use of the devices in zinc and lead foundries and hot galvanizing plants.

**1169. A New Instrument for Continuous Air Monitoring.** King, G. H. and Scobie, A. G. (Proc. of the 1969 Symposium. Technicon Instruments Co. Ltd., Hanworth Lane, Chertsey, Surrey). A continuous analyzer for the determination of  $\text{SO}_2$  in the atmosphere has been developed by the Technicon Corporation. The performance of the analyzer and several of its components

was subjected to laboratory tests. Stability, response characteristics, interferences, reagent composition, temperature effects and maintenance factors were investigated. The potential for conversion to measure  $\text{NO}_2$ ,  $\text{NO}$ , and oxidants is discussed. Various design concepts of continuous analyzers are compared.

**1170. "Environmental Surveillance—Why?"** Yungmans, R. S. (Proc. of the 1969 Symposium. Technicon Instruments Co. Ltd., Hanworth Lane, Chertsey, Surrey). The paper examines the need for detailed analysis and the stringent action that is taken to control pollutants in New Jersey, U.S.A.

**1171. Statistical Evaluation of Sulphur Dioxide Measurements in Northern Bohemia.** Podlaha, M. (Atmospheric Environment, 1969, **3**, 625-631). A method of obtaining reliable estimates of atmospheric sulphur dioxide concentration using the integration (absorption) method is described. The data from an auxiliary geographic network of instruments has been treated statistically making use of the "Student" distribution and some simplifying assumptions. The result predicts the probability that the actual concentration in the field of the network will exceed a pre-determined admissible limit over the given measuring interval.

The method is applied to actual measurements made near the towns of Most and Teplice in Northern Bohemia, with limits set at 0.15  $\text{mg SO}_2 \text{ m}^{-3}$  and 0.30  $\text{mg SO}_2 \text{ m}^{-3}$ .

**1172. Utilization of Steel Dusts by Chemisorption (In Polish).** Illinicz, J. and Porowski, L. ("Ochrona Powietrza", 1969, **5**, 7-9). The article discusses the possibility of utilizing dusts poor in iron oxides, from dust reducing installations of steel furnaces, by means of chemisorption in acid solution. The installations in question are those for which another method of dust utilization would be uneconomical.



# SMOKE CONTROL AREAS

## Progress Report

**Position at 31 December 1969**

(Figures for England supplied by Ministry of Housing and Local Government)

	England	Wales	Scotland	Northern Ireland
<b>Smokeless Zones (Local Acts) in Operation ...</b>	44	—	1	—
Acres, 3,400 ...				
Premises, 41,060 ...				
<b>Smoke Control Areas in Operation...</b>	2,987	6	139	17
Acres ...	777,419	418	74,242	6,911
Premises ...	4,046,378	2,352	351,716	8,422
<b>Smoke Control Areas Confirmed ...</b>	177	1	6	10
<b>Submitted ...</b>	78	—	8	3
<b>Grand Totals ...</b>	3,286	7	154	30

### Smoke Control Position in Regions of England at 31 December 1969

(Figures supplied by Ministry of Housing and Local Government)

(1)  Region	(2) No. of black area acres covered by smoke control orders con- firmed or awaiting decision	(3) Percentage* of total black area acreage in region covered	(4) No. of black area premises covered by smoke control orders confirmed or awaiting decision	(5) Percentage* of total black area premises in the region
Northern ...	32,289	25.76	149,171	26.97
Yorkshire and Humberside ...	171,940	45.65	572,882	49.05
East Midlands ...	57,677	21.49	175,312	34.25
Greater London ...	229,847	70.28	2031,757	76.97
North Western ...	177,147	44.15	758,875	44.56
West Midlands ...	81,492	32.72	359,331	35.12
South Western ...	7,505	28.49	28,697	19.26
Total (black areas) ...	757,897	42.72	4,086,025	52.54
Outside black areas	140,671		452,133	
<b>GRAND TOTALS ...</b>	<b>898,568</b>		<b>4,538,658</b>	

\* The percentage shown in columns (3) and (5) above are percentages of the total acreage and not the total number of premises in the black areas concerned. In practice it may not always be necessary for the whole of the black area authority's district to be covered by smoke control orders (e.g., there may be some areas of open country).

# New Smoke Control Orders

The lists below are supplementary to the information in the last issue of *Smokeless Air* (Winter 1969) which gave the position up to 30 September, 1969. They now show changes and additions up to 31 December, 1969.

Some of the areas listed are new housing estates, or areas to be developed for housing. The total number of premises involved will therefore increase. An asterisk denotes that there have been objections and that a formal inquiry has been or will be held.

The list of new areas in operation of smoke control is based on the plans submitted to the Ministry of Housing but may erroneously include some local authorities who have made postponements, without notifying the Ministry of the fact.

## ENGLAND NEW SMOKE CONTROL ORDERS IN OPERATION

### Northern

#### *Tyneside and Wearside*

Boldon U.D. No. 6, No. 8-12, 14 and 15. Hebburn U.D. No. 11. Whickham U.D. No. 8.

### Teeside

Hartlepool C.B. No. 13 and 14. Teeside C.B. No. 1-3.

### Yorkshire

#### *West Riding (North)*

Aireborough U.D. No. 25. Keighley B. No. 7. Leeds C.B. Nos. 74-77. Mirfield U.D. No. 10. Pudsey B. No. 8. Sowerby Bridge U.D. No. 3. Stanley U.D. (South Stanley No. 2).

#### *West Riding (South)*

Doncaster C.B. No. 11. Dearne U.D. No. 3. Mexborough U.D. No. 2. Sheffield C.B. No. 24.

### North Western

#### *South Lancashire and North-East Cheshire*

Ashton-under-Lyne B. No. 9. Atherton U.D. No. 5. Dukinfield B. No. 15. Eccles B. No. 10. Failsworth U.D. No. 8. Farnworth B. No. 4. Heywood B. No. 9. Horwich U.D. No. 1. Kearsley U.D. No. 3. Middleton B. (Compton Way) No. 15. Radcliffe B. No. 5. Royton U.D. No. 5. Stretford B. No. 13. Westhoughton U.D. No. 4. Worsley U.D. (Mount Skip Part 1) and No. 7.

#### *Central Lancashire*

Accrington B. No. 8. Barrowford

U.D. No. 2. Colne B. No. 7. Darwen B. No. 4.

#### *Merseyside*

Elesmere Port B. No. 9. \*Runcorn U.D. No. 4. St. Helens C.B. No. 6A. \*Warrington R.D. No. 1 and 2.

### Midlands

#### *Derby, Nottingham and Chesterfield*

Beeston and Stapleford U.D. No. 4. Carlton U.D. No. 5. Derby C.D. Nos. 14-17. Ilkeston B. No. 3 and 4. Mansfield B. No. 5.

#### *North Midlands*

Leicester C.B. No. 25 and 26.

#### *West Midlands*

Aldridge Brownhills U.D. No. 28. Bedworth U.D. No. 3. Birmingham C.B. No. 156. Nuneaton B. No. 6. Solihull C.B. No. 16. Sutton Coldfield B. No. 15.

#### *Potteries*

Stoke-on-Trent C.B. No. 23.

### South West

#### *Bristol*

\*Bristol C.B.

### London

#### *Greater London Boroughs*

Bexley L.B. No. 9. Ealing L.B. Nos. 42-44. Harrow L.B. No. 19. Havering L.B. No. 5. Hillingdon L.B. No. 12. Hounslow L.B. Feltham No. 9. Hounslow L.B. Brentford and Chiswick No. 10. Hounslow L.B. Heston and Isleworth Nos. 13 and 35-36. Islington L.B. No. 28 and 29. Kensington and Chelsea L.B. (A. Charles No. 1). Kingston-upon-Thames L.B. No. 14 and 15. Lambeth L.B. No. 21. Merton L.B. No. 12. Newham L.B. No. 6. Richmond-upon-Thames L.B. (Barnes No. 10). Richmond-upon-Thames L.B. (Twickenham No. 9). Richmond-upon-Thames (Richmond No. 10). Sutton L.B. No. 19 and 20). Waltham Forest L.B. No. 15.

#### *Outer London*

Dartford R.D. Swanley (East and Central).

### Local Authorities outside the Black Areas

Basildon U.D. N. 8. Belper R.D. No. 1. Cheltenham B. No. 4 and 5. Crawley U.D. (Northgate). \*Corby U.D. No. 2. Flaxton R.D. Nos. 1-3. Hale U.D. No. 2. Hazel Grove No. 4. Heanor U.D. No. 3. High Wycombe B. No. 16. Luton C.B. No. 7. Marple U.D. No. 2. Meriden R.D. No. 3.



New Windsor R.B. No. 1. Oxford C.B. No. 8 and 9. Potters Bar U.D. No. 3. Rugby B. No. 11. Scunthorpe B. No. 7. Skelmersdale and Holland U.D. No. 4 and 5. Southampton C.B. No. 7. \*Swadlincote U.D. No. 1. Tamworth B. No. 3. Watford Harwoods No. 6. Whitley Bay B. No. 5.

## **NEW SMOKE CONTROL ORDERS CONFIRMED BUT NOT YET IN OPERATION**

### **Northern**

#### *Tyneside and Wearside*

South Shields C.B. No. 4. Tyne-mouth C.B. No. 9-10.

#### *Teesside*

Darlington C.B. No. 5. Hartlepool C.B. No. 17. \*Teesside C.B. No. 4.

### **Yorkshire**

#### *West Riding (North)*

Leeds C.B. No. 80. Morley B. No. 40-41. Sowerby Bridge U.B. No. 8. Stanley (Durham) U.D. Tranfield Lea No. 1.

#### *West Riding (South)*

Barnsley C.B. No. 13. Darton U.D. No. 13. Rotherham C.B. Richmond Park No. 1. Sheffield C.B. No. 21.

#### *East Riding*

Kingston-upon-Hull C.B. No. 11.

### **North Western**

#### *South Lancashire and North-East*

#### *Cheshire*

Bolton C.B. Moss House Farm Hill-side. Crompton U.D. No. 2A. Horwich U.D. No. 2A. Oldham B. No. 16. \*Prestwich B. No. 9. Salford C.B. No. 14 and 22. Tottington U.D. No. 2.

#### *Central Lancashire*

Barrowford U.D. No. 3. Nelson B. No. 5. \*Preston C.B. No. 21.

#### *Merseyside*

Bebington B. No. 20 stage 3. St. Helens C.B. No. 7.

### **Midlands**

#### *Derby, Nottingham and Chesterfield*

Hucknall U.D. No. 3.

#### *West Midlands*

Aldridge Brownhills U.D. No. 32. Birmingham C.B. No. 150. Halesowen B. No. 31. Sutton Coldfield B. No. 16-17. Warley C.B. No. 9.

### **South West**

Bristol C.B. No. 10.

### **London**

#### *Greater London Boroughs*

Bexley L.B. No. 10. Ealing L.B. No. 46-47. Kensington and Chelsea R.L.B. (St. Charles and Golborn).

### **Local Authorities outside the Black Areas**

Hazel Grove and Bramhall U.D. No. 5. Hemel Hempstead B. Adeyfield No. 1. Meriden R.D. No. 4. Ramsbottom U.D. No. 3. Rawtenstall B. No. 1. Thurrock U.D. No. 7. Todmorden B. No. 8. Whitley Bay B. No. 6.

## **NEW SMOKE CONTROL ORDERS SUBMITTED BUT NOT YET CONFIRMED**

### **Northern**

#### *Tyneside and Wearside*

Blaydon U.D. No. 3. Wallsend No. 5. Whickham U.D. No. 9.

#### *Teesside*

Teesside G.B., Glebe Estate, Norton.

### **Yorkshire**

#### *West Riding (North)*

Brighouse B. No. 16. Huddersfield C.B. Marsh Grimscar. Mirfield U.D. No. 11. Pudsey B. No. 9. Shipley U.D. No. 10 and 11. Stanley U.D. (Durham) Dipton No. 1.

### **North Western**

#### *South Lancashire and North-East*

#### *Cheshire*

Ashton-under-Lyne B. No. 10. Atherton U.D. No. 6. Bolton C.B. (Rumworth No. 2). Eccles B. No. 12. Hyde B. No. 7. Middleton B. (Langley No. 10 and Heywood Old Road, No. 17). Stockport C.B. Offerton. Stretford B. No. 14.

#### *Central Lancashire*

Blackburn C.B. No. 10. Brierfield U.D. No. 5. Oswaldtwistle U.D. No. 1.

#### *Mersey side*

Bebington B. No. 18 and 20 stage 4. Runcorn R.D. No. 4.

### **Midlands**

#### *Derby, Nottingham and Chesterfield*

Beeston and Stapleford U.D. No. 11. Sutton-in-Ashfield U.D. No. 1/1969.

#### *North Midlands*

Leicester C.B. No. 27.

#### *Potteries*

Stoke-on-Trent C.B. No. 24.

### **London**

#### *Greater London Boroughs*

Ealing L.B. No. 48. Enfield L.B. No. 18. Greenwich L.B. (Woolwich Town Centre, Thamesmead, St. Nicholas and Little Heath). Harrow L.B. No. 21. Hounslow L.B. Brentford and Chiswick No. 11. Hounslow L.B. Heston and Isleworth No. 15, 17 and 18. Kingston-upon-Thames L.B. No. 16-17. Richmond-upon-Thames L.B., Twickenham No. 9. Waltham Forest L.B. No. 16.

**Local Authorities outside the Black Areas**

Canterbury C.B. (Westgate Court Avenue; Tennyson Avenue and Downs Road). Exeter C.B. (Pennsylvania No. 1). Hale U.D. No. 3. Rochester C.B. No. 6. Saltburn and Marshe-by-the-Sea U.D. No. 1. Southport C.B. No. 23. Staines U.D. No. 11. Swadlincote U.D. No. 2. Tamworth B. No. 4.

**SCOTLAND  
NEW SMOKE CONTROL ORDERS  
IN OPERATION**

Bearsden (Westerton). Bishopbriggs No. 1 (Springfield/Woodhill). Coatbridge (Cliftonville). Dumbarton Burgh No. 9. Galashiels (Wood St./Fifth Ward). Glasgow (Fairfield). Glasgow (Whiteinch). Paisley (Hunterhill). Port Glasgow No. 4. Renfrew Burgh No. 5. Stirling County (Bonnybridge No. 1).

**NEW SMOKE CONTROL ORDERS  
CONFIRMED BUT NOT YET  
IN OPERATION**

Glasgow (Yoker).

**NEW SMOKE CONTROL ORDERS  
SUBMITTED BUT NOT YET  
CONFIRMED**

Bearsden (No. 2). Coatbridge (Coltswood). Galashiels (Galapark/Wilderhaugh).

**NORTHERN IRELAND  
NEW SMOKE CONTROL ORDER IN  
OPERATION**

Belfast C.B. No. 2. Downpatrick U.D. No. 1. Holywood U.D. No. 3.

**NEW SMOKE CONTROL ORDERS  
CONFIRMED BUT NOT YET  
IN OPERATION**

Armagh U.D. No. 1. Belfast C.B. No. 7. Castlereagh R.D. No. 4.

**NEW SMOKE CONTROL ORDERS  
SUBMITTED BUT NOT YET  
CONFIRMED**

Londonderry Dev. Comm. No. 1. Londonderry Dev. Comm. No. 2. Newtownards B.C. No. 1.

**ORDERS SUSPENDED**

Up to the time of going to press, the following local authorities have been granted by the Ministry of Housing and Local Government orders to suspend the operation of their existing smoke control orders.

The effect of the Suspension Orders is from January 1970 until 30 April 1970 in most cases.

Chesterfield B.  
Chesterfield R.D.  
Darwen B.  
Horbury U.D.  
Huddersfield C.B.  
Kingston-upon-Hull (City and County).  
Knottingley U.D.  
Lancaster City.  
Mexborough U.D.  
Normanton U.D.  
Ossett B.  
Pontefract B.  
Rothwell U.D.  
Stanley U.D.  
Wakefield C.B.  
Wombwell U.D.



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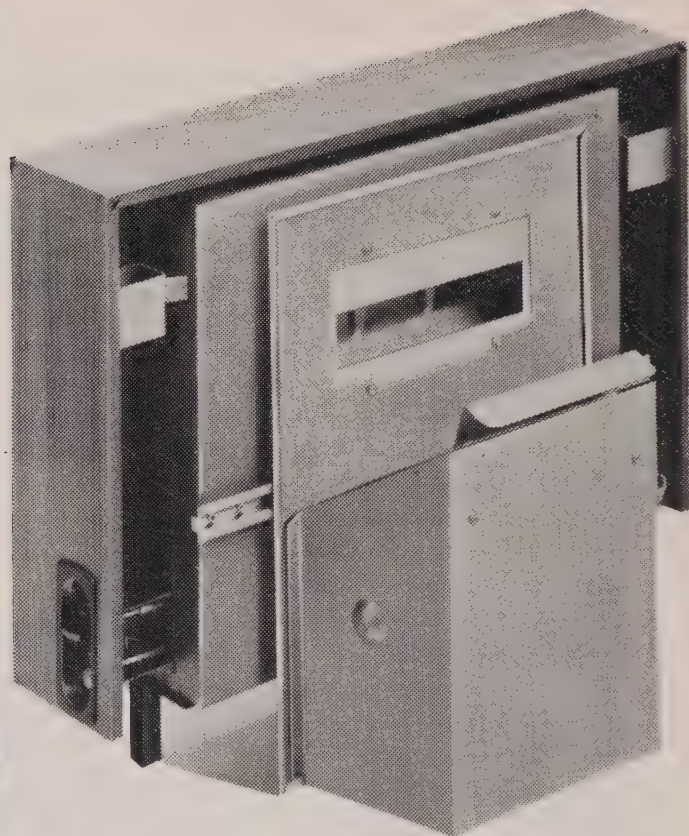
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flue, and put the complete hot water system back in action the same day the gas fire is installed. You've given the householder a controlled, cheap hot water system, independently powered from its own gas supply. Simple isn't it? But then most good ideas are.

**maxol** Back Boiler Unit  
hot water the easy way



Write for details to: W. H. DEAN & SON LTD., BURNLEY, LANCs. TELEPHONE: BURNLEY 21711



# INDUSTRIAL COLUMN

## ELECTRIC HOME HEATING

The Electricity Council held their Annual Trade Fair in Harrogate from 3 to 5 February. Known as the Electric Living Trade Fair it presented in one place everything new and electric for the home.

Although emphasis was placed on new cookers which were self-cleaning and had "Stay Clean" liners, on new dishwashers, washing machines and tumbler dryers, on new refrigerators in bright colours and in food freezers together with a multitude of smaller appliances such as kettles, blankets, toasters, coffee pots, food mixers, hair curlers, clocks and so on, from the point of view of Smokeless Air, the main items of interest were those which were connected with heating. Here, the emphasis has switched to the use of the off-peak tariff and the white meter which was announced at Harrogate a year ago. This white meter is now available in all Electricity Board areas. New heating and water heating appliances designed to take advantage of this economical tariff were shown on many stands. The white meter electricity is charged at two different rates; a day rate and a cheaper night rate. By this means, it is possible to cut heating and water heating costs. High capacity storage radiators that build up their heat at night and do not require any boost during the day have, of course, been in use for some time, and there were many of these to be seen at the exhibition. However, the

1970 models have an improved performance and a good design that enables them to blend in well with home surroundings; but the bigger development was in the Electricaire ducted warm air central heating units which are now also available for use with the white meter tariff systems. This allows a much greater flexibility of control with no increased size. By using electricity at normal rates it is possible to boost the working of the storage heaters during the day especially in cold weather.

Five manufacturers exhibited water heaters and water heating systems for use with the white meter tariff. By heating up the contents of a conventional hot water cylinder at the cheaper night rate and "boosting" with the help of a second heater during the day, it is claimed that substantial savings can be made in the cost of hot water.

The design of direct acting heaters has been improved and it was claimed that several of the new models now give a better heat output than those sold a few years ago. One system has been adapted with thermostats and time switches to take advantage of the new white meter tariff.

Space will not allow of a description of every one of these systems but we were impressed by all we saw and there is no doubt that this



The Enviwarm CMF Heater in a hall cupboard

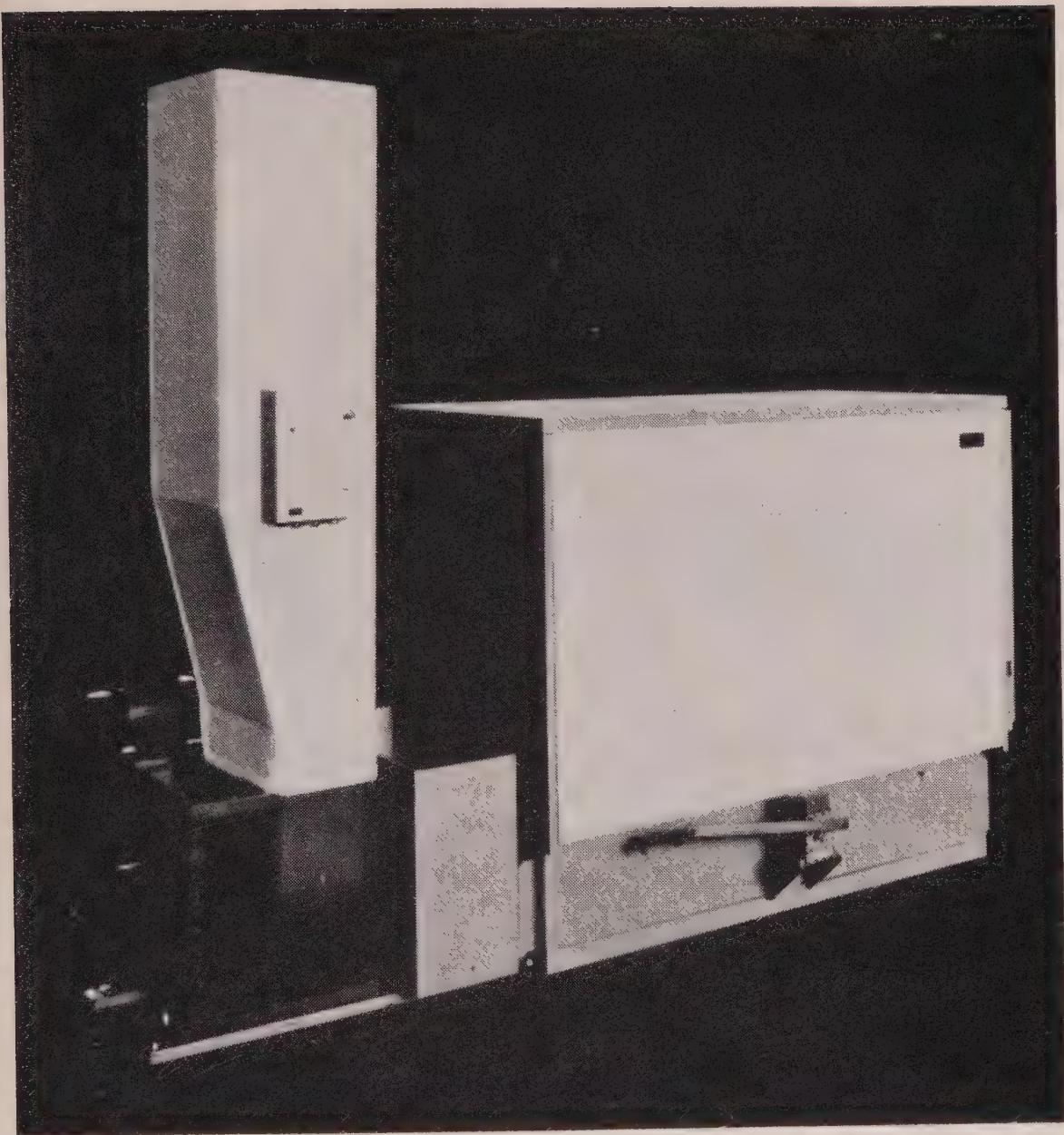
form of heating has much to commend it. The Enviwarm "CMF" heater illustrated below can be installed unobtrusively in a cupboard in a hall. The system contains stub ducts to registers in the hall and kitchen and radial ducts from a bottom take-off to registers in the sitting room and dining room, and a rising duct to the upstairs bedrooms. Ventilation of the cupboard and return air is by means of high and low level grilles in the hall.

Heatrae now offer full central heating from off-peak electricity. This has been achieved by adding a series of Electricaire units to the already existing range of water heating equipment which has been especially designed for the new white meter tariff. There is a range of 11 models of Electricaire Heaters from

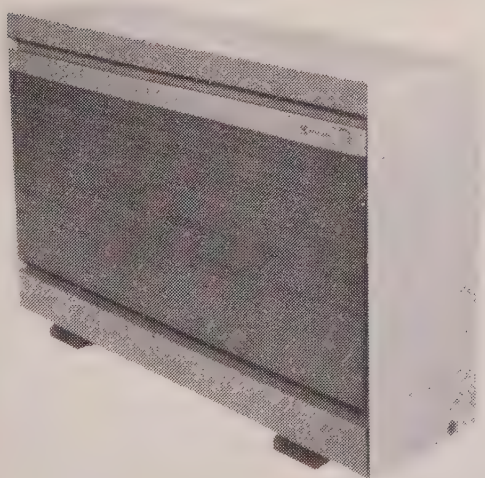
6-18 Kwts. with outputs varying from 57-173 kilowatt hours. An optional extra is a direct acting device which allows normal controls to be over-ridden to provide additional heat if required. For hot water heating, Heatrae were exhibiting their "Twin-Heat" White Meter Immersion Heater. This is fitted with two separate heating elements independently controlled by two stem type, immersed thermostats. The long three kilowatt element heats the total contents of the tank at the off-peak rate. The short two kilowatt element is used to heat the top capacity only at the normal rate if excessive demand uses up the complete hot water store.

Selex Electricaire Limited showed their range of Super-Slim models.





The Accubloc 32 k.w. heater



The Electrolux GU 24 Storage Heater

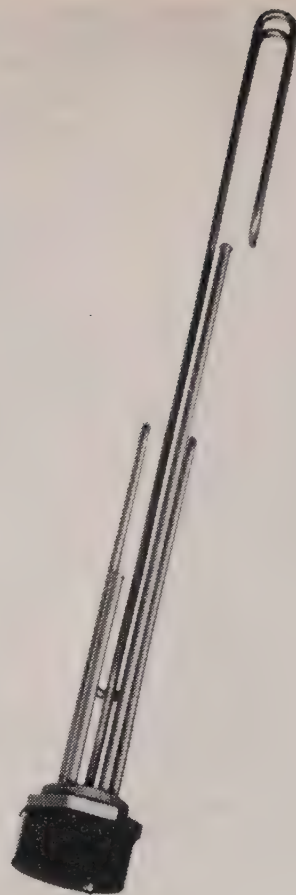
Though these vary in height they are all no wider than 18 inches.

Multitherm Limited showed a rather different form of heating in their Multitherm Instatherm storage heating system for small bore central heating, using a solid Electricaire type core with an air-to-water heat exchanger to heat the radiator water.

Heatstore Limited of Wigan, showed their new Super-charge 8 range.

Electrolux Limited exhibited their new storage radiators and the one we show is the 3.5 kilowatt G.U. Storage Radiator.

A.C.E.C. (Ateliers de Constructions Electriques de Charleroi) of Charleroi, Belgium, exhibited in this country for the first time. They have also specialised in Electricaire type heating and night storage heaters. The installation illustrated is the Accubloc Electricaire type heater with a capacity of 32 Kwts.



The Heatrae Twin-Heat

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## PEOPLE IN THE NEWS

### Two Board Appointments at Pye Unicam

A 35-year-old Cambridge graduate, Mr. C. S. M. Scott, and a former accountant with Pye of Cambridge Ltd., Mr. A. T. Norris, have been appointed to the Board of the Queen's Award winning company—Pye Unicam Ltd. This was announced recently as a further step in the development of the Pye Group subsidiary, formed in 1968 from the rationalisation of the Pye and Philips activities in the analytical instrument field.

### "Danesmoor" Appoint National Sales Force

R. H. Ingham Limited, Clay Cross, Chesterfield, have announced the formation of a national sales force as part of their intensive sales programme covering the launch of the "Danesmoor" range of oil-fired, fan pressurised pot boilers.

John Bosworth is appointed U.K. Field Sales Manager, responsible for countrywide product sales. Mr. Bosworth was previously Midland Area Manager with B.S.A. Harford Heating Limited.



## **Representation in Ireland**

The following changes have been made in Radiation's representation in Northern Ireland, Eire and the Isle of Man:

Mr. C. G. S. Rolls will be the Area Manager for Northern Ireland and the Isle of Man and will represent the following companies: Ascot Gas Water Heaters Limited; Radiation Gas Fires Limited and Radiation New World Limited.

Representing the same companies as Mr. Rolls, Mr. C. McNamee has been appointed Area Manager for the Republic of Ireland.

## **Gas Council Appointments**

The Gas Council has appointed Mr. Raymond B. Sharman as Industrial Contracts Manager with the Marketing Division with effect from 1 February 1970.

Mr. Sharman has been Industrial Sales Manager with the West Midlands Gas Board since 1968.

Two new appointments in Gas Council Marketing reflect the continuous emphasis on policy co-ordination.

Mr. E. A. Haynes has been appointed Sales Manager (Domestic Gas) and Mr. Bryan C. Smith, Chief Customer Service Manager.

The Gas Council has appointed Mr. John C. Griffiths to succeed Mr. R. F. D. Green as Public Relations Adviser.

## **New Directors for NIFES**

Sir Charles Goodeve, O.B.E., D.Sc., F.R.S., formerly Director of the British Iron and Steel Research Association, and Mr. L. V. D. Tindale, C.A., Director and General Manager of the Industrial and Commercial Finance Corporation Limited, were appointed Directors NIFES in December 1969.

## **International Consultancy Service Director**

Harry R. Hart, who has been the Deputy Chairman of the Scottish Gas Board since 1960, has been appointed Director of the gas industry's new International Consultancy Service.

The service has been designed by the Gas Council and Area Boards to make available the resources of the Gas Council to British consultants and contractors, on all aspects of the industry's activities. The rapid build-up of natural gas supplies has greatly accelerated the industry's knowledge and experience in such specialist spheres as pipeline engineering and gas utilisation.

## **Two New Appointments at Beeston Boiler Co.**

Mr. Robert David Greg has been appointed Chief Development Engineer of the Beeston Boiler Co. Ltd. He has joined the Company from Ruston and Hornsby Limited of Lincoln.

Mr. G. E. S. Dunn has been appointed Manager of the London Office. He was formerly with Shell Mex and BP as industrial fuels representative.

## **North Western Regional Marketing Director Appointed**

The National Coal Board have appointed Mr. E. O. Tindle to be Regional Marketing Director of their North Western Sales Region. He succeeds Dr. Paul Glover whose appointment as Principal of the Board's staff College was announced in October last.

### **Last Ship-Load of Coal for North Thames Gas**

Friday, 23 January 1970, saw the end of an era spanning more than 150 years when the M.V. "Falconer Birks", a 2,675 ton collier secured alongside the jetty of the North Thames Gas Board's Nine Elms works on the south bank of the Thames midway between Vauxhall and Chelsea bridges and began to discharge its final 2,400 ton cargo of coal.

Coal for gas making has been brought by ship from the North-East coast to London ever since 1814. Since 1912 the Stephenson Clarke Shipping Company have been managers for these colliers during which time they have made 87,553 voyages, carrying well over 92 million tons of coal to London's gasworks. These colliers ran continuously throughout two world wars, suffering inevitable losses from German U-boats and aircraft and there is a long list of officers and men from the ship's crews who were decorated for their gallantry.

### **Catton's Foundry Dust Extraction and Collection Contract**

A contract has recently been awarded to AAF-Ltd., by Catton & Co. Ltd., for the supply, delivery and erection of Air Pollution Control Equipment in their new Foundry located near Leeds.

The contract valued at approximately £130,000 will employ the AAF Type R Roto-Clones, which are wet centrifugal type collectors, in the various systems in the foundry.

### **One Thousand Million**

The Electricity Supply Industry from time to time rightly publicises its achievements and the steady growth in demand for electricity in the Industrial, Domestic, Commercial and Agricultural spheres have not been far short of astronomical.

Of special interest therefore is the announcement of the Electric Vehicle Association concerning the growth of battery operated electric vehicles and industrial trucks. It is now estimated that the target of 1,000,000,000 units of electricity used in electric vehicles per annum has been met and passed.

Nowhere else in the world is the 'electric' used so extensively and successfully as in the United Kingdom. For milk and bread deliveries and for similar trades, no less than 45,000 are in daily use. In industry, electric trucks now number of 75,000, about 70 per cent of the total in use for materials handling and this, in spite of severe competition from the internal combustion petrol and diesel engines.

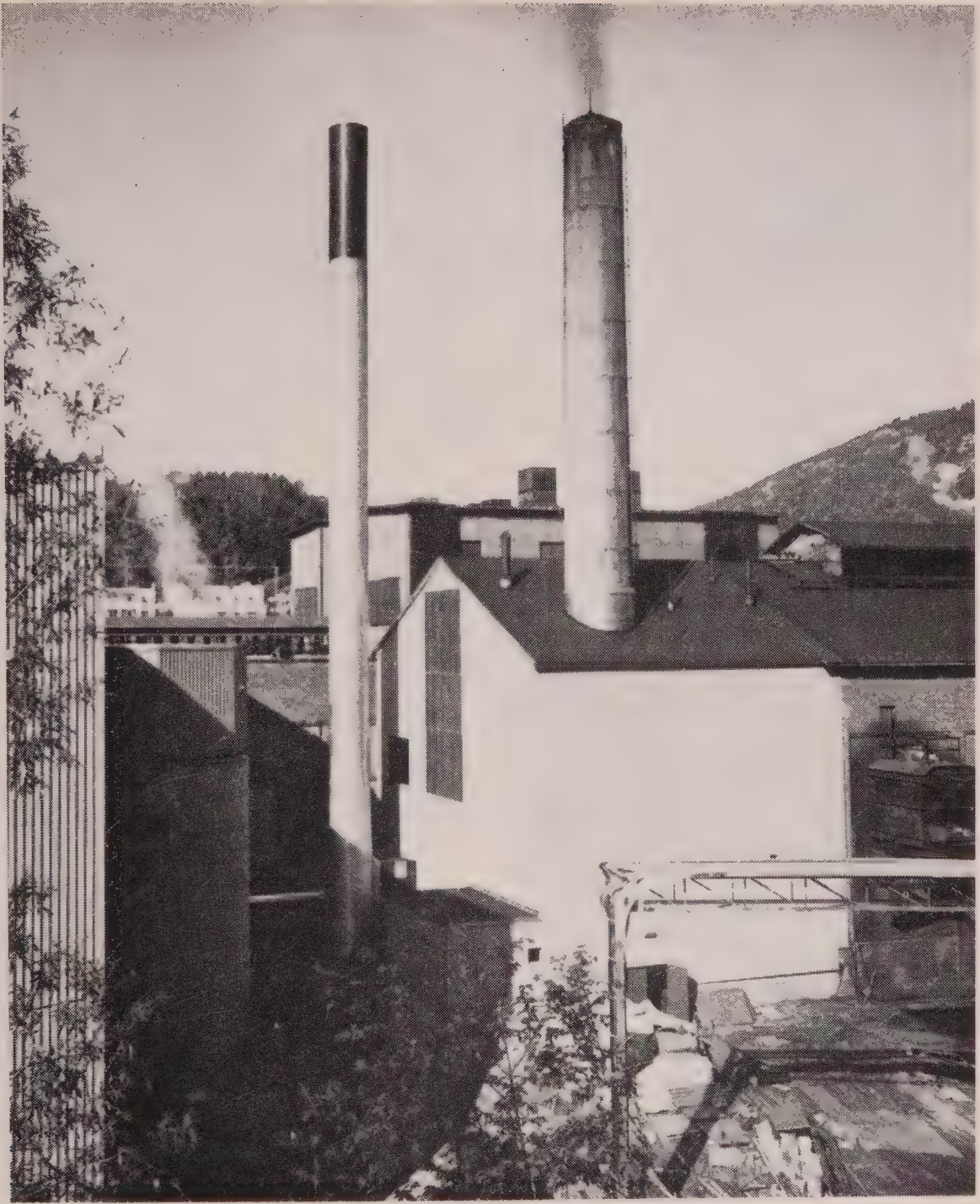
With running costs per mile anything from a quarter to a tenth that of their competitors, a thousand million units of electricity could propel a sizeable delivery van nearly a thousand million miles or about 2,000 return trips to the moon.

Astronomical?

### **Increased Trade Demand for Wednesbury Microbore**

The Wednesbury Tube Company recently announced that orders equivalent to over 2,000 complete Wednesbury Microbore Central Heating systems, have been received from heating installers and builders merchants in the last six weeks.





A Beaumont chimney in Canada

### **Can Spring be Far Behind**

Break the ice with irresistible proof that British enterprises can deliver, and you soon find yourself on firm ground, standing tall in the sunshine. Canadian industry is rapidly discovering that there's

nothing shaky about a self-supporting Beaumont chimney, according to Canadian Erectors Limited. The Montreal based company, which holds the Canadian Licence for fabricating and erecting these custom-designed industrial chimneys, reports a second order within five months



of the first installation, and claims more wide-spread interest that will soon be translated into further orders.

Now Canadian industry, under increasing public pressure to abate air pollution, has a working demonstration of the industrial and power-plant steel chimneys that meet the stringent requirements of Britain's Clean Air Acts.

### **£300,000 Order for Fume and Water Treatment Plant**

An order valued at more than £300,000 has been placed with W. C. Holmes & Co. Limited by Stewarts and Lloyds Construction Limited for fume and water treatment plant for the Corby Works of the Tubes and Pipes Division, British Steel Corporation.

The plant comprises three gas cooling/conditioning towers, ducting, isolating valves, dampers and an effluent treatment plant which provides recirculation water. Each of the cooling/conditioning towers is designed to reduce the temperature of gases from a 100 tons LD/AC Converter from 1,250°C. to 150°C.

### **Europe's Most Modern Automated Foundry**

As Europe's most modern automated foundry swings into action at the Beeston Boiler Co. Limited, Nottingham, news is to hand of yet larger boilers being planned, with an output in the 20,000,000 BTU/hr. range.

Suitable for oil or gas firing, the "Series 5" cast iron sectional boiler, the result of five years of research at Beeston, is now being exported to Europe, probably the first cast iron sectional boiler to be sold abroad for nearly a century.

### **Gas Cleaning Plant for Steelworks**

A £155,000 order for gas cleaning plant for the Cleveland Works of Dorman Long (Steel) Ltd., has been placed with W. C. Holmes & Co. Ltd.

The plant comprises three electrostatic precipitators and ancillary equipment to handle a total volume of 2½ million cubic feet of waste gases per hour from a blast furnace producing ferro-manganese.

### **Aerodynamic Model of Gas Cleaning Plant**

An aerodynamic model of the gas cleaning plant which is to be installed on a 16 ton per hour refuse incinerator for the County Borough of Bolton, has been constructed in the Research and Development Department of W. C. Holmes and Co. Ltd., Huddersfield. The model will be used in connection with gas distribution tests.

The gas cleaning plant comprises a conditioning tower to reduce the temperature of the flue gases from a peak of 2,000°F to 570°F, and a two-field electrostatic precipitator designed to give an outlet burden not exceeding 0.1 grains per cubic foot at NTP.

### **Cibel Gas Cleaning Plant Order**

The receipt of an order worth over £30,000 for gas cooling and cleaning equipment for Commercial Smelting and Refining Co. Ltd., is announced by Cibel Engineering Co. Ltd., of Walsall. The plant will handle the exhaust gases emanating from oil fired rotary furnaces, and includes a fully automatic fabric filter dust collector operating in conjunction with an induced draught gas cooler.



### **National Coal Board Order Lodge-Cottrell Precipitator**

To prevent air pollution at the National Coal Board's 'Phurnacite' plant at Aberaman, South Wales, Lodge-Cottrell Ltd. of Birmingham, have received an order worth approximately £50,000 for the supply and installation of an electrical precipitator.

The unit comprises a vertical flow precipitator designed to remove fine coal dust from 33,000 cubic feet a minute of dryer gases. In addition the precipitator will recover a valuable quantity of coal for re-processing to make smokeless fuel.

### **Environmental Data Recording System**

The air pollution control industry has now available from Westinghouse, new tools that will assist in collecting and analyzing the mass of data required for evaluating air quality.

The system can start small and expand as the needs for information on air quality intensify. It can operate with the output of existing sensors or be connected parallel with them. It may operate in parallel with on-line or real-time systems, acting as the collection system for permanent file and as a back-up to prevent loss of data from communication or computer interruption.

In combination, the data collection system and digital computer offer the air pollution control industry a yardstick to measure what degree of control is required. This yardstick will make possible decisions that are based on factual supporting information rather than those that are based on rational and intuition.

### **New Venture for Harvey Fabrication Limited**

Following on from their successful entry into the field of Dust Collection by their agreement with The Torit Corporation of U.S.A. to manufacture and market Torit equipment in the United Kingdom, Harvey Fabrication Limited have announced the formation of an independent department concentrating its activities within the field of Dust and Fume Control Equipment in all its aspects.

Based at the Company's Greenwich Works, the new Dust and Fume Control Equipment Department is headed by Mr. F. S. Prickett, who has been concerned with the sales of this type of equipment since the agreement with the Torit Corporation was first signed.

### **'Mikropul' Cross the Road to New Premises**

Mikropul Limited, manufacturers of a wide, versatile range of dust collectors, gas scrubbers and pulverizers have moved, little more than 100 yards to new headquarters. Although still situated on the Towerfield Industrial Estate, Shoeburyness, the company's new building offers vastly increased capacity for production. In the last year trading figures have increased considerably and expansion plans have been prepared to cope adequately with the current growth rate.

### **Withdrawal from Industrial Field**

Radiation Gas Fires Ltd. announce that they are no longer manufacturing gas heaters for the industrial field.

### **American Order for Lodge-Cottrell**

Lodge-Cottrell Limited has received its first order for gas cleaning equipment in the United States. The order, which is for two electrostatic precipitators for a boiler at the Culley Power Station, Indiana, has been received through Lodge-Cottrell's associate company, Lodge-Cottrell Incorporated of Birmingham, Alabama. The value of the

order is approximately £250,000, and a large part of the equipment, which is of all-British design, will be exported from Lodge-Cottrell's Birmingham works.

As far as is known, this is the first time a U.K. manufacturer has sold major equipment for combating air pollution in the United States.

Lodge-Cottrell is a Simon Engineering Company.

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## **EQUIPMENT AND SERVICES**

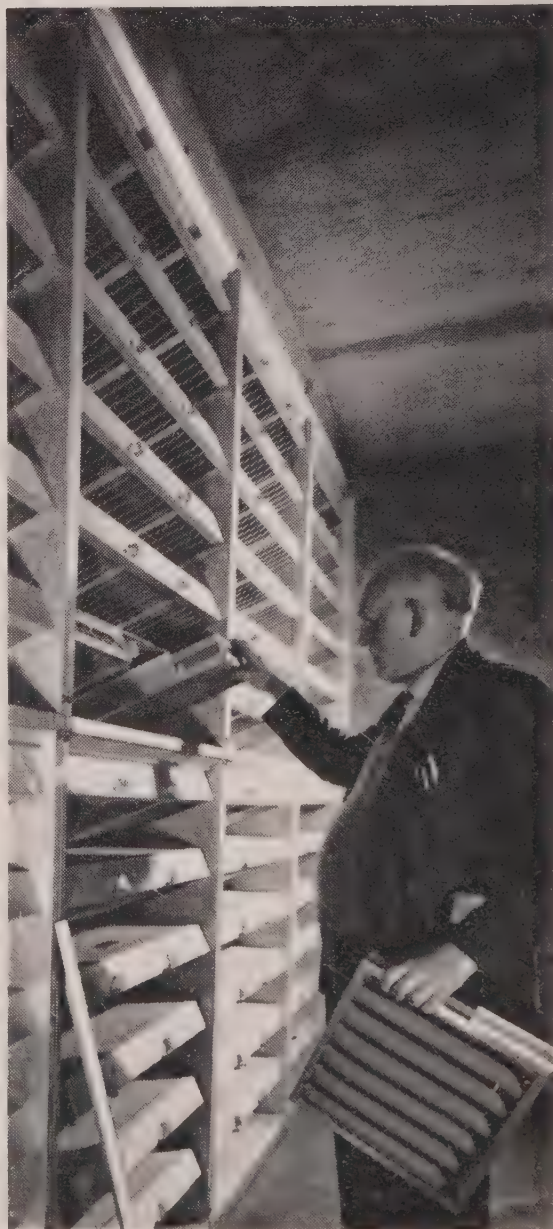
### **New Air Filter Design**

Davis Industrial Filters Limited of Croydon, are now marketing a new air filter of their own design of which ease of maintenance is a main feature.

The filter is of unit construction assembled in a front-withdrawal louvre type casting.

The individual units are so arranged that when they are withdrawn for maintenance, the disturbed dust or dirt falls safely into trays on the "dirty" side of the filter assembly. The upward airflow also ensures that heavy dirt particles drop away from the units.

Effective sealing is ensured as the plastic elements of the metal framed filter units are slightly compressed by the channel guides of the assembly when the units are inserted.



The Davis Air Filter



Loading the Brulé Incinerator



### **Incinerator Saves Fruiterers £10,000 per year**

A Brulé B-2000 smokeless incinerator, which reduces 2,000 lb./hour of vegetable rubbish to 1/500th of its volume, has been installed by G. M. Gerrards (Fruiterers) Ltd., at their distribution depot, Park Royal, which serves 148 retail outlets in the south of England.

Hitherto, Gerrards have been using trailers to cart and tip the refuse each week, an operation which was costing them £250-£300 per week. The new incinerator will have estimated running costs of only £70 per week and it is expected that the capital cost will be recovered within nine months. Gerrards are the first U.K. Company to take delivery of this type of high capacity incinerator.

### **New Range of Liquid Fuel Controllers**

ECONOSOL is the name given by Chalbar Ltd. to a new range of liquid fuel controllers. These are Econosol PBC for 'Pre Burner Control' and Econosol BCC for 'Boiler Combustion Control'.

Fuel companies spend much time and money to ensure that their deliveries are the best possible; subsequent fuel care in the consumer's storage tank is the responsibility of the boiler user. Even oils delivered in perfect state by fuel suppliers are liable to deterioration, and these products offer the boiler engineer a simple tool that provides an effective aid to deal with most of the troubles associated with storing and burning of oil fuels of any viscosity.

Granted that good boiler practice is in operation and that the mechanics of the installation are correct, sludging, corrosion of tanks and boiler metal, blocked valves, lines and jets, smutting and a host of other potential problems can still arise, and it is in these areas that these products are designed to operate.

### **Portable Fast-Response Oxygen Analysers**

Designed primarily to determine safe-entry conditions in confined spaces such as mines, sewers, silos, tunnels, tanks, etc., Bacharach Model K Oxygen Indicators are now being widely used to measure the oxygen content of hydrocarbons, nominally inert gases and tail gases in oxidation reactions, and to monitor inert-gas purging operations.

All three instruments in the series are very compact and easily portable and no special setting-up procedures or calibrating gases are required.



The 74 ft. Thermotank chimney is lowered into position at Dover



## **74 ft. Steel Chimney Erected at Dover**

The new control building and passenger complex, currently under construction at Dover Harbour Board's Eastern Docks Car Ferry Terminal and Hoverport, has moved a further step towards completion following the installation of a 74 ft. Dribore insulated steel chimney, which was recently erected on the boiler house roof, 26 ft. above ground.

Manufactured at the Glasgow Factory of Thermotank Products, a division of Hall-Thermotank International Ltd., an interesting characteristic of this chimney is its composition of seven tubes of different heights of which two are the main 'dribore' flues. The remaining tubes are structurally necessary for the stiffness of the chimney and also contribute to the unusual but pleasing 'organpipe' design. The 'Dribore' method of construction ensures a minimum heat loss throughout the height of the chimney thus maintaining the gases above the acid dewpoint, a feature which prevents condensation and thereby reduces atmospheric pollution.

## **Reducing Solid Wastes**

A new brochure has been issued describing the Mil-Pac system offering an economical and efficient method of treatment at source wherever large amounts of disposable materials are generated.

Described as being suitable for high-rise apartment buildings, hospitals, commercial and industrial plants, institutions and large scale catering establishments. The Mil-Pac system causes no air pollution and uses a Hammermill to pulverise all types of solid waste including glass, metal cans, paper, plastic, vegetable matter, rags and other wet and dry refuse.

The pulverised product is compressed into dense briquettes which are relatively dry and odour free, unattractive to vermin and easily disposable.

A variety of models are available capable of dealing with a throughput ranging from seven cubic yards per hour and they are offered as a fail-safe unit, completely automated or with simple push-button controls.

## **New 'Twin-Element' Air Filter**

The New Duplex Twin-Element Air Filter is the latest development from the well-known Heather E/V Multi-Brush Filter which has earned its reputation in the past 35 years.

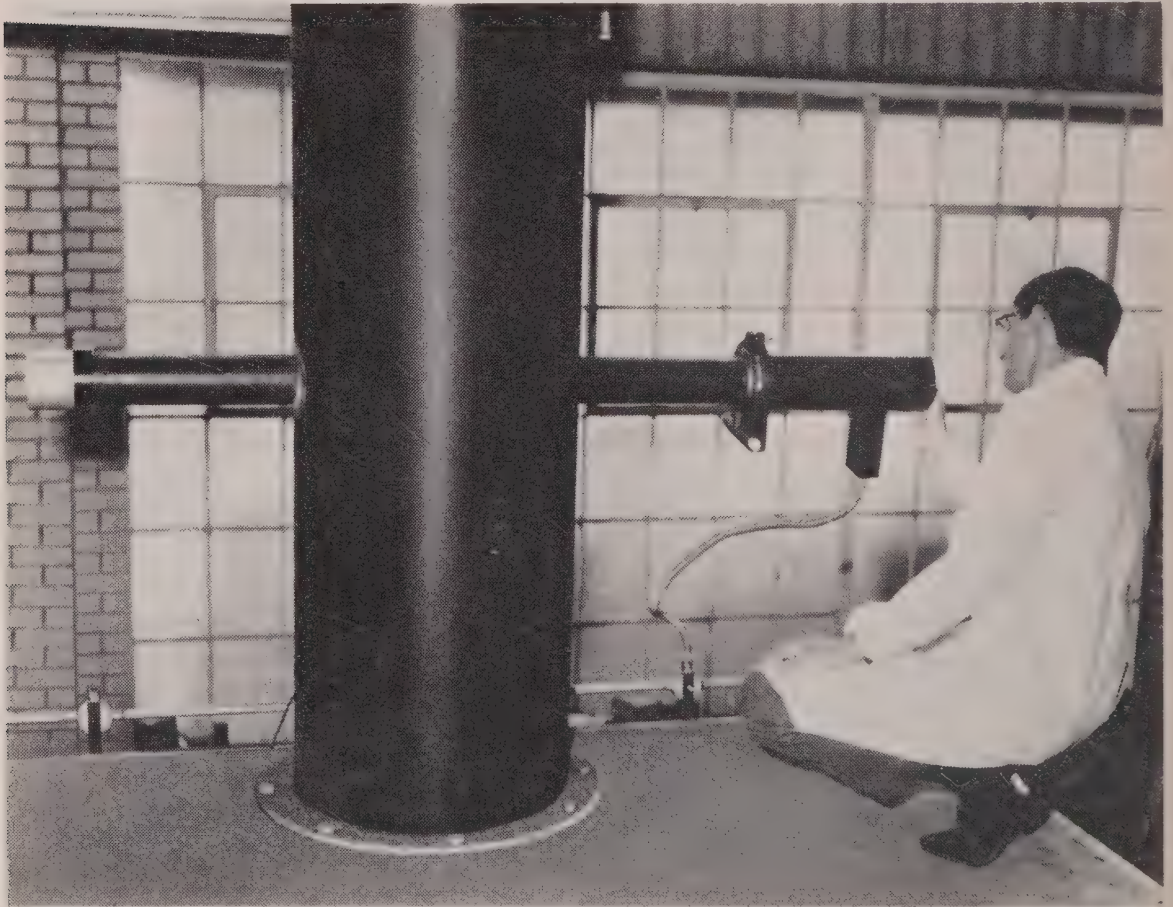
There are three models available, as a complete twin-element filter unit, or secondary filtration section only as an addition to existing filter frames and thirdly the secondary filter section only as an independent cell.

## New Aid to Industrial Smoke Control

The Optimometer, a new unit for accurately measuring and controlling the volume of fuel oil smoke emission from industrial chimneys and drastically reducing the level of pollutants in the smoke, has been developed at Poole, Dorset, by the Combustion Division of Hamworthy Engineering, part of the Powell

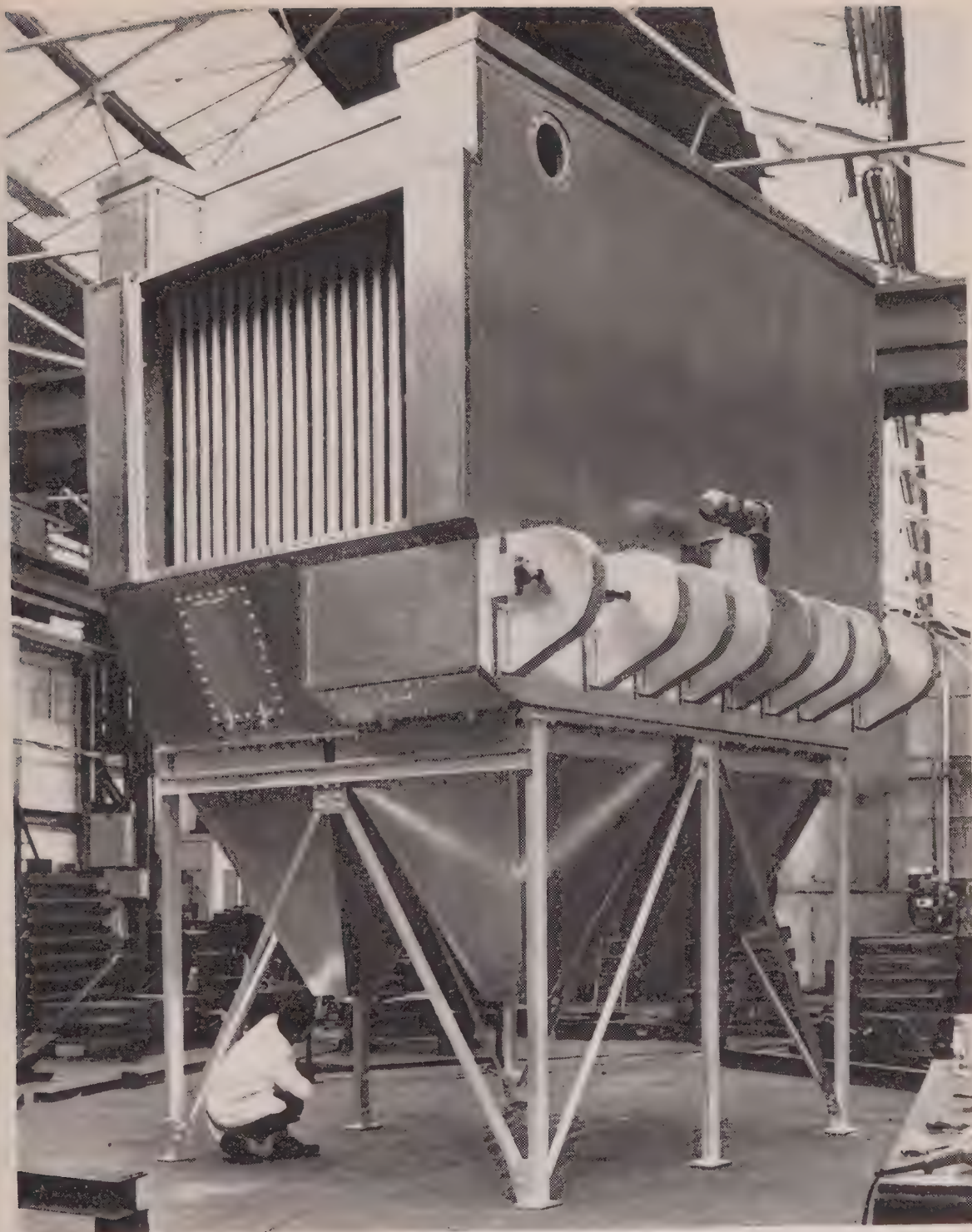
Duffryn Group.

Production is now underway following successful field trials, and the company expect a big demand for the Optimometer at home and overseas because trials have shown that it ensures not only that clean air regulations are observed more efficiently but that boiler operations save money in the process.



The optical unit of the Optimometer installed in a chimney





### **Package Unit Electrical Precipitator**

Lodge-Cottrell Ltd., Birmingham, have introduced a standard factory-built dust collection precipitator unit which can be connected in series, parallel or a combination of the two. This makes it unnecessary for a special unit to be designed and manufactured for every application,

thereby cutting capital costs and minimising site erection.

The units can achieve a specific efficiency under a particular set of operating conditions and can be installed on a short delivery basis without interrupting production schedules.

# SMOKELESS INCINERATORS

*for*

Industrial and Municipal Refuse,  
Chemical and Plastic Wastes, Old Furniture,  
Scrap Cable

# FUME DESTRUCTORS

# GAS WASHERS

CONSULT

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**14 COOPERS ROW, TOWER HILL, LONDON, E.C.3.**

**TELEPHONE 01-709 9931**



# COMMUNITY PROTECTION...

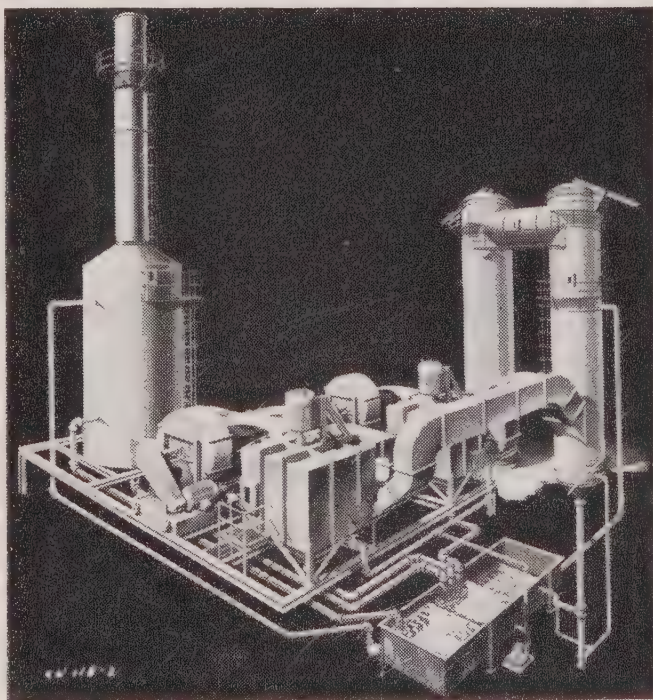
IS EVERYONE'S ENVIRONMENTAL DUTY

## INSTALL A **CENTRI-SPRAY®** **DUST AND FUME CONTROL SYSTEM**

... and be sure that your plant is doing all it can to prevent the release of dangerous air-borne contaminants.

Air pollution caused by industrial contaminants released in the air, can mar the beauty of your city and impair the health of its citizens. The Centri-Spray® Limited Air Engineering specialists will analyze your Air Pollution Control requirements, and design, build, test and install a complete Dust and Chemical Fume Control System to satisfy the most rigid Air Pollution Control Codes in your community.

Only a complete system designed for your particular Air Cleaning needs can give you assurance that all of your discharge air is free of damaging dust and chemical fume contaminants. Sustained efficiency under continuous operation—Self-Cleaning system—Minimum maintenance—Plus recovery of valuable air-borne compounds, are only a few of the advantages which can be realized by installation of a Centri-Spray® Engineered Dust and Chemical Fume Control System.



Typical Cupola Installation

Air washers and dust collecting systems are available in any capacity, from 2000 CFM in a single unit to over 500,000 CFM in a multiple foundry cupola installation.

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Green Dragon House,  
64-70 High Street, Croydon, Surrey, England.  
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# **REXCO**

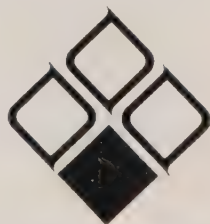
## **A Pioneer in Clean Air.**

The Rexco Group of Companies have been contributing to Britain's Clean Air since 1935.

Since the mid 'fifties' a massive programme of investment in plant and distribution facilities has led to a ten-fold increase in turnover—today running at some £6 million a year, and increasing still.

Manufacturing facilities at key mining locations in England and Scotland.

Rexco looks forward to the day when smoke is a thing of the past—and the Rexco Group of Companies will be proud to have been pioneers in the process.



**The Rexco Group of Companies**

Including Midland Rexco Ltd, Scottish Rexco Ltd,  
NCC Plant & Transport Ltd, NCC Engineers Ltd.

**National Carbonising Company Ltd.**  
**Mansfield, Notts.**



# SMOKELESS AIR

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JOURNAL OF THE NATIONAL SOCIETY FOR CLEAN AIR

No. 154



SUMMER 1970



5s.

# **SMOKELESS INCINERATORS**

*for*

Industrial and Municipal Refuse,  
Chemical and Plastic Wastes, Old Furniture,  
Scrap Cable

# **FUME DESTRUCTORS**

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Unhurried calm. Unspoiled beauty.  
These are two of Derbyshire's greatest gifts  
to everyone in Britain today.

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glorious warmth  
of an open fire  
with 'Coalite'  
smokeless coal.

***'COALITE'***  
**THE MODERN SMOKELESS COAL**



**In the 1950's he could hardly see the Houses of Parliament...now he keeps an eye on Hampton Court!!**



Britain is winning the second Battle of Trafalgar—the fight to get rid of grime in Trafalgar Square and in streets and open spaces throughout the United Kingdom.

In smoke control areas, oil plays a strategic role in the campaign for cleaner air and for cleaner chimneys.

Oil-firing is inexpensive too. In fact, it is the most economic of all fully automatic fuels for industrial, municipal and domestic users. If you want the facts phone any of the numbers below.

What we can tell you will help clear the air

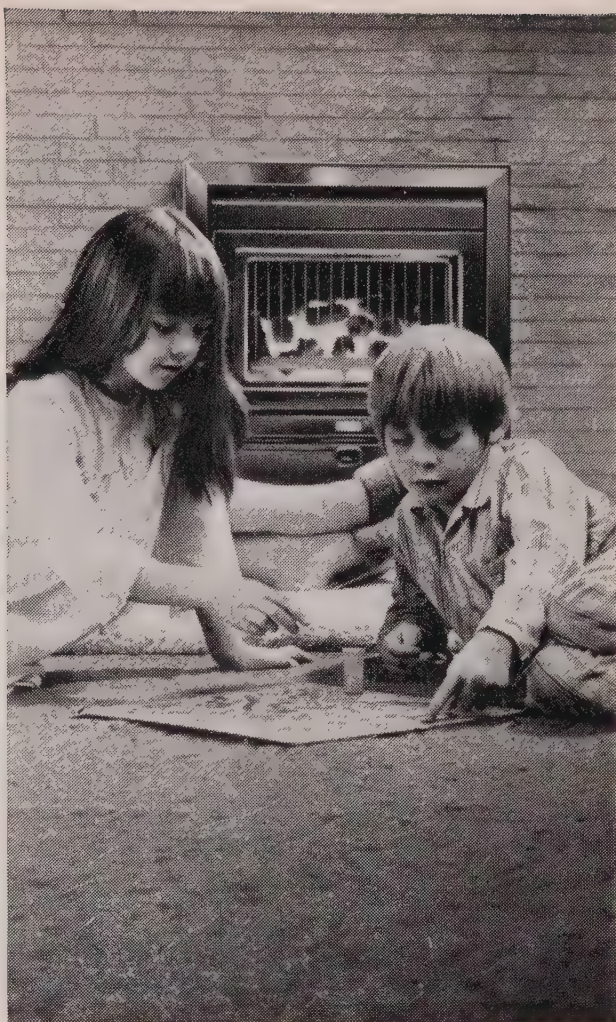
**Shell-Mex and B.P. Ltd Shell-Mex House Strand  
London WC2**

Birmingham: 021-495 9898 Bristol: Bristol 294211 Glasgow: 041-221 3821  
Leeds: Leeds 33133 Knightsbridge London: 01-589 4511  
Manchester: 061-273 3312





**Here's  
one way  
of enjoying  
clean air**



**Here's the  
warm-  
hearted way**

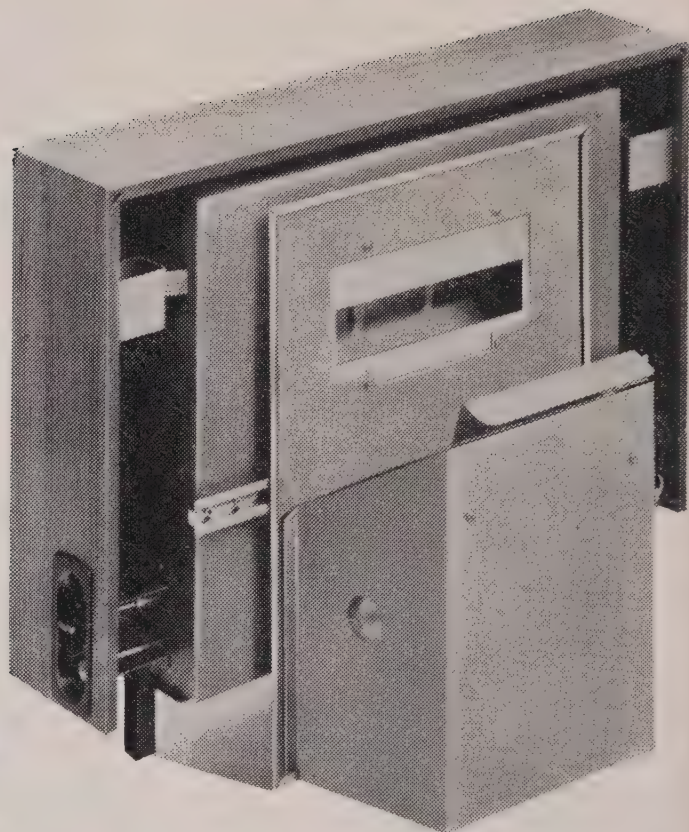
Only solid smokeless fuel gives you the cheerful glow of a real fire, *plus* clean air, constant hot water and full or partial central heating.

What more could you ask of a modern heating system? Today's new fires and roomheaters can be fitted with powerful back boilers to give you all the benefits of central heating at its most efficient, whilst allowing you to keep the traditional comfort of a living fire in your hearth.

**Welcome home to a living fire**

Issued by the National Coal Board






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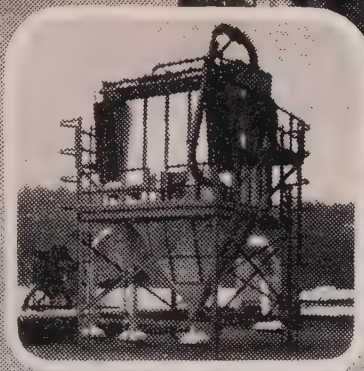
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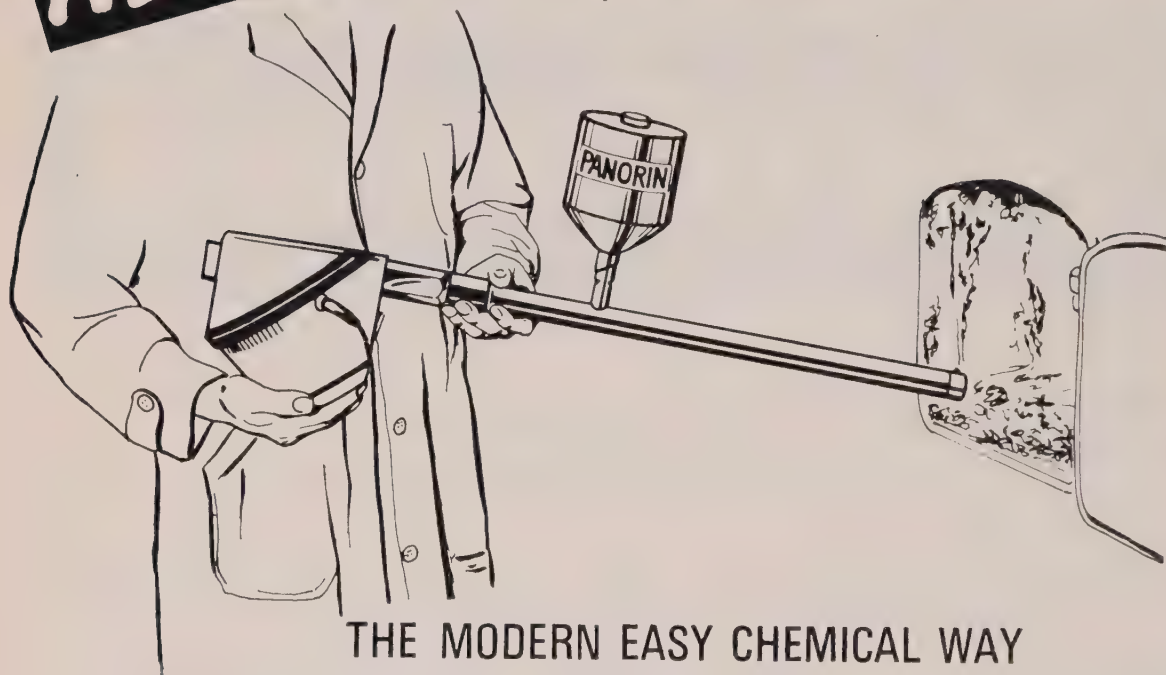
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# SMOKELESS AIR

Vol. XL No. 154

Summer 1970

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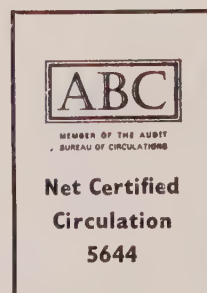
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*Ships, towers, domes, theatres, and temples lie  
Open unto the fields, and to the sky:  
All bright and glittering in the smokeless air*

# SMOKELESS AIR

## *Action, now!*

Anger over the shortage of solid smokeless fuel continues to mount. Those local authorities who were among the first to institute smoke control areas and who, accepting the assurances of the solid fuel industry that adequate supplies would be available, transferred, in the main, to this form of heating, feel that they are the victims of broken promises. The householders themselves who have to rely on this form of heating, feel that they have been "conned".

At every Divisional meeting of the Society all over the country, grave concern about the coming winter has been vehemently expressed and resolutions urging the Government to take positive action have been passed. So far, the action taken has been to continue to suspend more existing smoke control orders, to defer until the spring of 1971 the operational dates of any new smoke control areas, and to keep open temporarily three gas-coke works scheduled for closure. This is hardly positive action in support of a clean air policy in European Conservation Year.

In our last issue, we urged action in two ways: the deferment of the closure of coal-gas works until the new plants furnishing reactive solid smokeless fuels are in proper production, and the redistribution of existing supplies of what solid smokeless fuel there is to those who need it most. It is fully realised that such measures will be costly and may be unpalatable to some, but those people who rely on this fuel in existing smoke control areas have a right to be warm, and to be warm in a smokeless environment. If these measures cannot be implemented, then the unfortunate householders concerned should have the right to transfer to a smokeless fuel which is available and the Central Government should bear the cost of the installation of new appliances.

As regards new smoke control areas, there is no need to wait until supplies of solid smokeless fuel can be guaranteed to be available even in the coldest winter. Other fuels are available and local authorities should be given the right to go ahead at once and bring into operation smoke control areas using such fuels. This is action that could be taken now—and it ought to be.

In the longer term, the urgent need for a proper fuel policy is emphasised once again. Until we have this, then muddle and broken promises will continue. It is no good hoping for mild winters; we live in a cold climate. Everyone is entitled to be warm and to be warm in an environment of clean air.

At the time of writing rumours of a General Election are in the air; whichever party is returned to power and all have been expressing their interest in conservation, in the environment and measures against pollution—here is an opportunity for them to take prompt positive action which will be to the well-being of all who live in this country.

### *A Lesson for Us?*

The Italians are beginning to take a keen interest in air pollution and are becoming particularly concerned, especially in the larger cities, about emissions from road vehicles. As with us, there is as yet no legislation in Italy regarding pollution from road vehicles, although it is believed that such legislation will be introduced very soon.

In the meantime the Comune di Milano (the City Council of Milan) have decided to get on with the job themselves on a voluntary basis. Nine teams from Milan's public health department, under the direction of Dr. Cappoui, have been equipped with Bosch "breathalysers" which can be attached to the exhaust pipe of cars and which measure the percentage of carbon monoxide emitted.

These teams take up their positions around the city and request cars to stop and be "breathalysed". If the car's emissions are within the prescribed limits, the driver is given a blue sticker for the windscreen. If the emissions are over the limit, the driver is asked to take his car to a garage—or indeed the Alfa Romeo or Fiat factory—where his car will be tuned and the carburettor adjusted free of charge. The car is then tested again, and, if it passes the test as most do, it is given a blue sticker. There is no compulsion on the motorist; but as the service is free and as the motorist benefits by improved fuel consumption as a result of the adjustments made, few refuse to comply with the request made.

The published figures indicate that the results have been most encouraging. A few cars do not need adjustment, but most do. But about 80 per cent of those "adjusted" pass the test the second time.

Could the public health departments of our own major cities do something similar? True they would have to be suitably equipped with "breathalysers" and there could be staffing problems. Would major garages and motor vehicle manufacturers also agree to give help free of charge? This we do not know because they have not been asked, but we believe that they might. Would the motorist comply? We believe he would as a great many motorists would like to see action taken about pollution from cars. Finally, will one of our large cities lead the way?



# Towards Cleaner Air

*By Rear Admiral P. G. Sharp, C.B., D.S.C., Director, the National Society for Clean Air*

At the outset, it should be made clear that this is a vast subject and in this survey of air pollution as a whole, it will only be possible to touch on some of its aspects. But 1970 is European Conservation Year, and it is a good time to take stock.

## **History and Sources**

The sources of air pollution fall naturally into two classes—natural and man-made. It, therefore, seems likely that from the earliest days there has always been some form of air pollution present; and equally, no matter what steps are taken now and in the future there will always be some pollution—that from natural sources. Such sources we have always accepted and shall have to accept in the future. It is not intended, therefore, to say very much about them here. Typical of such sources are natural dust and pollen. In this country we now pay more attention to the pollen count which as elsewhere in the world, in the United States for example, is published in newspapers along with meteorological information.

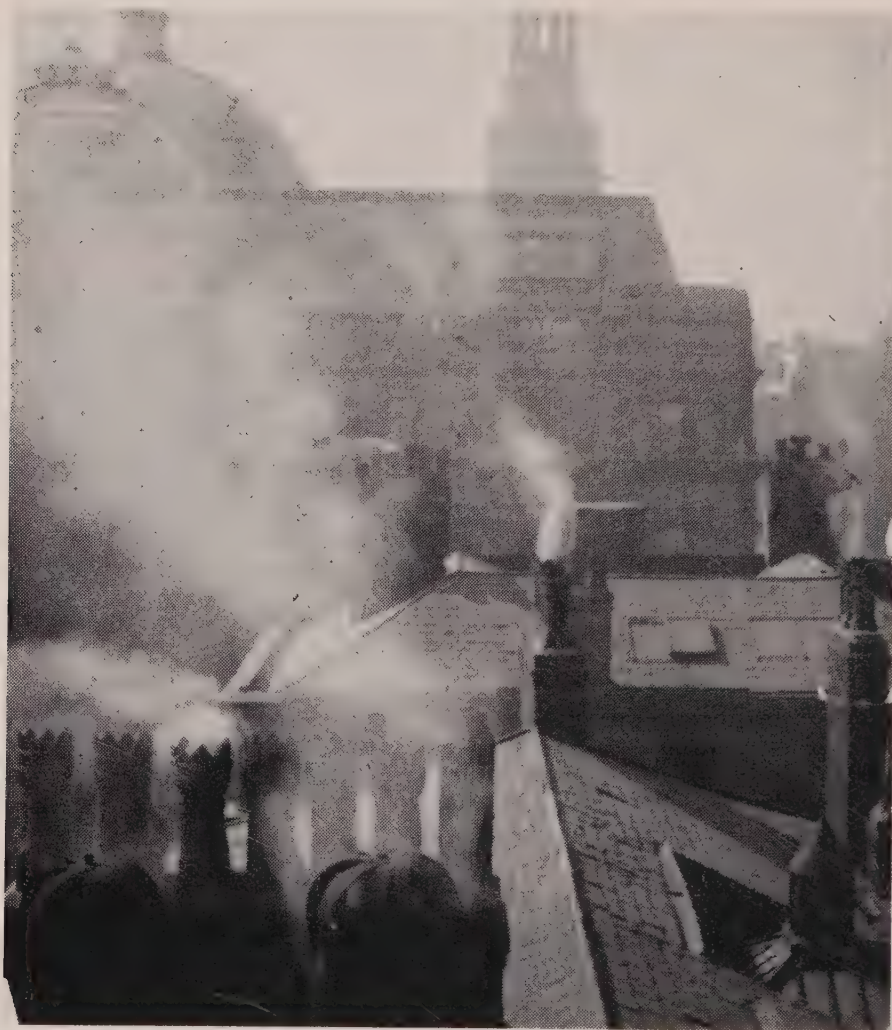
Dust, not man-made, has always been with us and we shall always have to endure a certain amount of it in the future. We all know the means that are used to keep down dust, such as the watering of our city streets, but it is not my province to deal with large dust clouds which arise in certain parts of the world due to soil erosion.

Again, I do not intend to consider the pollution of the atmosphere by natural smoke and pollutants emitted by volcanoes or as the result of earthquakes. Here again, I suggest we have no alternative but to endure it.

We are concerned in this paper with the air pollution which is man-made; something on which remedial action can be taken. Most of this pollution arises from the combustion, or rather the imperfect combustion of fuels used in the production of heat and energy and the consequent production of smoke, fumes, grit, dust and soot. So it can be said that man first started to pollute the atmosphere when he first discovered the use of fire. Other forms of pollution have their sources in particular industrial and chemical processes; and the most modern source of pollution is that caused by the use of nuclear energy.

If we look briefly at the history of domestic heating, man first used wood as a fuel; originally in the open air and then in his cave and subsequently in his house or dwelling. The smoke from such fires was allowed to escape through a hole in the roof, but later man learned the use of the chimney and the fire grate.

Wood is still used as a fuel for domestic heating today. We know that coal was certainly used in London and the provinces in the 13th Century—and probably earlier as in the year 1228 its use is denoted by reference to Sacoles (sea-coals) Lane. Coal is still used in large quantities for domestic heating today. It has continued to be the main fuel for domestic use for over seven hundred years.



Domestic Smoke as it used to be

Bituminous coal, the usual “coal” as we know it, when not burned completely, as is the case when it is used in the open grate, produces smoke. Initially the particles of tarry and sooty material are very fine, but they tend to coagulate, and the denser the smoke emission, the greater this coagulation becomes. The tarry matter present makes the smoke particles adhesive, and some cling to the chimney in the form of soot; others are emitted in the visible smoke and are deposited around the neighbourhood. Smoke is not the only consequence of uncomplete combustion. Hydrogen, methane and carbon monoxide, which normally burn and contribute to the heat evolved, escape in the flue gases. Bituminous coal can be burned properly, as in a modern furnace, provided there is a sufficiency of oxygen (air) and the temperature of the fire is maintained above the ignition temperature of the volatile matter in the coal.



In the last century the introduction of coal gas and the consequent production of coke saw its introduction as a domestic fuel; and the present century has seen the introduction and now wide use of solid smokeless fuels of the more reactive type, the use of which received impetus from the introduction of smoke control areas and the passing of the Clean Air Act in 1956.

The last hundred years or so have also seen the introduction of gas, electricity and oil for domestic heating on a large scale. And during the last few years—and it is still continuing—we have witnessed the advent of the use of natural gas.

Undoubtedly, too, the last few years have seen a form of social revolution and a move away from the old-fashioned open domestic fire. More and more people are adopting some form of central heating, not necessarily because this makes a contribution to clean air, but because they wish to live in warmer houses; and with the decline of the domestic servant, fewer wish to bother with the removal of ashes from fire grates and the carrying of solid fuel. Nevertheless, domestic smoke from the burning of the bituminous coal is still responsible for about 70 per cent of the smoke in the atmosphere in this country.



Industrial smoke from Stoke as it once was  
(By kind permission of J. C. Ellis, Hanley)

The history of the use of fuel in industry to a large extent follows a similar pattern to that of its use in the domestic field. Wood was the earliest fuel used and the coming of coal at the end of the 13th Century was resisted. Indeed, in 1306, a Royal Proclamation was issued prohibiting artificers from using sea coal in their furnaces and there is a record of one offender being executed for polluting the atmosphere. The following year, a commission of enquiry was appointed to "enquire of all such who burnt sea coal in the city or parts adjoining". Nevertheless, in spite of whatever action the commission of enquiry may have recommended we know that the use of coal continued down the centuries and it was upon the use of this coal, our indigenous fuel, that the Industrial Revolution was founded and our prosperity as a nation at that time established.

The time of the Industrial Revolution in the 18th and 19th Centuries was the period when the principle of *laissez faire* held sway and this principle was applied to smoke and pollution of the air. Smoke meant wealth and no real attempt was made to control it.

Industry burns large quantities of coal today, but not in the uncontrolled manner of past decades, but in efficient, modern furnaces. In addition, the more modern sophisticated fuels such as electricity, gas, oil and now natural gas, are being used in increasingly large quantities. But the industry that still uses coal now has an efficient furnace and a chimney that rarely emits dark smoke.

This contribution of industry towards cleaner air is a major one, but it has not been entirely altruistic. The Clean Air Act has been one factor; the economic factor is another. Smoke is caused by the incomplete combustion of the fuel, when it is not in fact being used economically. If fuel is burned properly there is no smoke. We have moved from the days of the man-fired furnace when the man who did the firing was an odd job man with little or no engineering knowledge to the automatically controlled furnace where the maximum efficiency is gained. The smoke has abated, but the sulphur dioxide—for coal and much oil contain sulphur—is increasing; it is colourless and cannot be seen. Nor can the grit and dust—until they settle.

In addition to pollution from combustion there are specific sources from processes listed under the Alkali Act. Originally, this Act dealt with processes in the heavy chemical and related industries where obnoxious or offensive gases were the potential offenders. But over the years the Act has been extended by adding to the list of the scheduled processes such undertakings as oil refineries and a number which are responsible for the emission of smoke, grit and dust. Among such processes are included iron and steel smelting, some copper and aluminium processes, gas and coke works, electricity works, coal-fired producer gas plants, lime kilns and certain ceramic kilns fired by coal or oil, sulphate reduction and caustic soda plant, and the processing of uranium, beryllium, selenium and their compounds.

Under the Alkali Acts, as they are usually called, there remain some of what might be termed the black spots of industry so far as clean air is concerned—brickworks, iron and steel works, and cement works, to name a few.





North Wilford Power Station, Nottingham  
(By kind permission of Sturtevant Eng. Co. Ltd.)

The use of nuclear energy for the production of electricity, which is slowly gaining momentum, has been very carefully controlled from the outset. There are most stringent regulations regarding the degree of pollution allowable under any circumstances; and the continued application of increased knowledge gained from experience and the study of health physics has ensured that such regulations have kept pace with the developments in the use of nuclear fuels. It is true that things can go wrong and that there have been accidents such as at Windscale some years ago; but we have learned from such events and the radioactive pollution from nuclear power stations is negligible. The main problem would seem to arise from the disposal of radioactive waste, a problem that will increase as more nuclear power plants become operative. It might be said that had stringent regulations, similar to those controlling the use of nuclear fuels now, been applied to the combustion of fossil fuels from the outset, we might well not be faced with some of the air pollution problems with which we have to compete today.

With the growth of industry during the Industrial Revolution came the growth of transport. In this, the wheel may said to have turned full cycle.

In the 18th Century communication throughout the country was by horse traffic on indifferent roads. We then advanced through the railway age with the steam engine to the motor vehicle and the roads as we know them today.

Similarly, at sea, we passed from the age of the sailing ship to that of the steam and motor ship. And in the lifetime of some of us, the aeroplane has developed from a collection of strings and struts with a simple petrol engine to the jet engined aircraft of the Concorde type.

What has all this left us with?

In the domestic field, a mixture of fuels is being used. At one extreme there is the old open fire burning bituminous coal and producing smoke and sulphur dioxide. At the other end of the scale there is the modern dwelling heated by district heating with a modern automatic furnace and a high stack.

Industry uses all the fossil fuels.

In the realm of transport, steam has given place to electricity on the railways. On the roads, we have the tremendous increase in the use of the motor vehicle. Conventional steam propulsion is still at sea; but it is being gradually displaced by the diesel engine, the gas turbine and the nuclear powered steam plant.

From domestic heating, from industry, and from transport the air has been and is polluted by smoke, fumes, grit and dust, sulphur dioxide, carbon monoxide, carbon dioxide, hydrocarbons and nitrogen oxides to list only some of the main pollutants.



A cement works  
(By kind permission of A. M. Pope, Gillingham, Kent)



The trend in the usage of fuel in the last thirty years and the amounts used are clearly shown in Table 1.

**Table 1.**  
**Main Uses of Primary Forms of Energy in Great Britain in 1938, 1956**  
**and 1967 in Millions of Tons**  
*Derived by Dr. Albert Parker, C.B.E., from Statistical Digests of Ministry of Power*

Year	1938	1956	1967
<b>Coal</b>			
Domestic, including miners' coal	50.4	37.5	23.0
Electricity supply industry	14.9	45.6	66.6
Railways	13.2	12.1	0.8
Collieries	11.9	7.9	2.9
Industrial, etc.	47.2	54.6	30.9
Coke ovens	19.1	29.3	23.1
Gas supply industry	19.1	27.8	14.4
	175.8	214.8	161.7
<b>Coke</b>			
(excluding consumption in gas works and blast furnaces)			
Domestic, including other manufactured solid smokeless fuels	3.0	4.0	6.3
Industrial and miscellaneous	7.9	11.6	6.9
<b>Oil</b>			
Domestic	0.6	0.9	2.2
Industrial	1.4	11.2	41.5
Gas supply industry	0.1	0.5	3.5
Road transport	5.2	8.1	16.4
Railways	—	—	1.0
Marine craft (inland)	0.1	0.8	1.1
	7.4	21.5	65.7
Hydro-electricity (coal equivalent)	0.7	1.3	2.7
Nuclear electricity (coal equivalent)	—	—	8.9
Natural gas (coal equivalent)	—	—	1.9
<b>Total coal equivalent, including oil at 1 ton equal to 1.7 tons of coal</b>			
	189.1	252.6	286.9

**Effects**

Turning from the sources of pollution to the effects and dangers from pollutants, this is a major study in itself and I can only hope to very briefly sketch some of the dangers under three main heads—fauna, flora and materials.

As regards man, medical opinion is sometimes conflicting but it is agreed the main effects of air pollution are on the respiratory system. The effect of smoke on the lungs and the respiratory system can be seen in the accompanying diagrams. Bronchitis has long been known as the English disease. I do not think I need pursue this point further as it is well known that the



Lung Section of a Countryman



Lung Section of a Town-dweller

country dweller is at an advantage when compared with the town dweller. Effects due to the obstruction of natural light are a little less obvious but nevertheless they do exist: and there are psychological and social consequences of life in a smoke-ridden environment.

Sulphur dioxide is generally considered to be harmful especially in association with smoke particles. However, recent information on this subject is a statement by Professor P. J. Lawther, Director of the Air Pollution Unit of the Medical Research Council, to the effect that in his view, and on the present state of knowledge, smoke in any concentration is undesirable and can well constitute a hazard to health; it should be eliminated as far as is economically possible. There is no evidence, however, that reasonably low concentrations of sulphur dioxide are, of themselves, harmful, and if the concentration of smoke is low, Professor Lawther would be inclined to accept peak concentrations of up to 1,000 microgrammes per cubic metre of sulphur dioxide. Anything in excess of this, however, he considers to be potentially harmful, at least to some people. Dr Craxford, of the Air Pollution Division of Warren Spring Laboratory states that this would mean aiming at a limit of some 100 to 150 microgrammes per cubic metre for the average winter concentration.

The main danger to animals from air pollution is that from fluorides. These are emitted in aluminium smelting and in certain brick making operations. The fluorides are deposited on the vegetation, ingested by the cattle and affect the teeth and bones and can eventually lead to emaciation.





Fluorosis in cattle  
(By kind permission of Associated Newspapers)

The effects of air pollution on vegetation are those caused by the loss of sunlight, the blocking of stomata by deposits, by acidification of the soil and by the direct effects of sulphur dioxide. Their harmful effects may be due to the gas in isolation or to that carried down on deposited material. Experiments have shown that sulphur dioxide alone particularly in a humid atmosphere, can retard growth, lower vitality or even kill plants. Some plants are more resistant than others, and the effects on coniferous trees has been especially noted. Not only does the acid act detrimentally upon leaves, but, when washed into the soil by rain, it acidifies it and destroys or reduces the nitrifying bacteria on which the root system depends for the assimilation of nitrogen. The consequences can be both destructive of amenity and economically costly to farmers, nurseries, horticulturists and forestry industries.

However, it is significant that as the sunlight and cleaner air have returned to London, so it has become possible for flowers and various other plants to grow where previously only privet and laurel were to be seen.

As regards materials, the sulphur oxides promote atmospheric corrosion of almost all metals other than gold and other noble metals; they erode alkaline building stones such as the limestones and dolomites used in many famous buildings and they erode concrete and cement. Obviously the effect of the sulphur oxides cannot be considered in isolation from other pollutants and other environmental factors, but it seems clear that in urban areas



sulphur pollution is the most potent corrosion promoting agent. Reliable estimates are that the total cost of corrosion in Britain is in the region of £600 million per year; of this, air pollution is one of the major causes.

Turning from sulphur dioxide to smoke itself, the black buildings we still see in some of our cities are evidence alone of what this has done in the past. Happily many of these buildings are now being cleaned and restored to something of their former glory. But the story does not end there; the pollutants in the air also have serious effects on fabrics, on leather and paper—books and libraries for example.



Erosion of stone-work  
(By kind permission of the Controller, H.M.S.O. Crown copyright)

### **Alleviation, Prevention and Legislation**

Man has been aware of the pollution of the air and at any rate some of its effects for a very long time and has frequently initiated some sort of action to alleviate or prevent it. This action has, naturally, followed a different pattern in different countries; but as Great Britain led the World in this prevention and alleviation of pollution, I intend to deal briefly with the history of what has been done in this country and even more briefly with what has been done elsewhere.

The use of coal was prohibited in London as long ago as 1273 because it was considered "prejudicial to health". Some 33 years later, a Royal Proclamation forbidding artificers from using sea coal in their furnaces was issued, and it is on record that one offender against this edict was executed. A year later, in 1307 in London, a Commission of Enquiry was



appointed to "enquire of all such who burnt sea coal in the city or parts adjoining, and to punish them for the first offence with great fines and ransoms and upon the second offence demolish their furnaces".

There is now a gap in history until 1578 when Queen Elizabeth, "findeth herself greatly grieved and annoyed with the taste and smoke of the sea coals". The Queen may have been annoyed, but it seems that very little was done about it. Some 70 years later, Londoners petitioned Parliament to prohibit the importation of coal from Newcastle on account of the injury experienced from it being burned in the city. History does not record how successful they were, but again it seems they did not achieve very much. A few years later in 1661, John Evelyn submitted his "Fumifugium, or the smoke of London dissipated" to Charles II. Again, this seems to have had little effect.

With the coming of the Industrial Revolution came the period of the policy of *laissez-faire*, and nothing was done to prevent or alleviate air pollution for a considerable period of time. It is true that in the early 19th Century a number of select committees were appointed to enquire into nuisances from furnaces and steam engines of one sort or another, but it was not until the middle of the century with the passing of the first Alkali Act in 1863 and the Public Health Act in 1875 that any real legislation appeared on the statute book.

The Alkali Act amended through the years and consolidated again in 1966 is still in force today. The principle which it established of using the best practicable means for preventing the escape of obnoxious or offensive gases to the atmosphere and for rendering such gases harmless and inoffensive still applies today and has been, to a large extent, the basis for all legislation regarding clean air.

The Public Health Act of 1875 consisted in all of some 347 sections; of these six sections only applied to smoke. Here, smoke was dealt with as a nuisance and it was necessary for nuisance to be proved before action could be taken against any offender. This legislation still applies and has been amended and extended by the Acts of 1891 by the 1926 Public Health (Smoke Abatement) Act and by the Public Health Act of 1936.

At the same time as legislation came into being and of which possibly it was a direct result, public opinion about the nuisance of air pollution was growing, at least in certain quarters. In 1881, a Smoke Abatement Exhibition was held at South Kensington by the Public Health and Kyrle Societies; and in 1882, the National Smoke Abatement Institution was founded. This Institution, which today, we might call a pressure group, did not last very long, but in 1899 the Coal Smoke Abatement Society led by Sir William Richmond, R.A., and Dr. H. A. Des Voeux was founded. This Society has continued to today and is now the National Society for Clean Air.

The early years of this century saw the formation of a number of Smoke Abatement Societies in various parts of the country who amalgamated into a League in 1909. These obviously wielded some influence, because in 1913 a Smoke Abatement Bill was introduced into the House of Commons



St. George's Hall, Liverpool—Blackened stone in  
contrast with that which has been cleaned  
(By kind permission of Derek Hargreaves Photography, Liverpool)

and reached the Lords early in 1914; but was withdrawn on the appointment of a departmental committee to investigate the problem.

The Great War brought this work to a temporary end, but in 1920 the committee was reformed and published its report in 1921. In 1929 the Coal Smoke Abatement Society and the Smoke Abatement League of Great Britain amalgamated to form the National Smoke Abatement Society; this in turn became the National Society for Clean Air in 1958.

Beyond that of which I have already made mention, there was little legislation or activity as such between the Wars, although had war not broken out in 1939 it would seem that more vigorous action with regard to the abatement of smoke might well have been taken about that time. However, soon after the end of the Second War in 1946, the first smokeless zone was established in Manchester by the prior approval legislation of the Manchester Corporation Act, and in 1951 the first smokeless zone was established in Coventry. This idea of the smokeless zone had been put forward by a former chairman of the Clean Air Society.

Industry was already putting its house in order in that it was learning to burn fuel efficiently and economically, but apart from the few smokeless zones little had been done about domestic smoke.

And then in December 1952 came the London smog with a death roll of some 4,000. This might be termed the catalyst which caused the Government to act and set up the Beaver Committee on air pollution. This was done in 1953 and an interim report was issued by the Committee that year.



The final report was issued in 1954. In the same year a Clean Air Bill was introduced by Sir Gerald Nabarro. It was subsequently withdrawn when the then Government undertook to introduce clean air legislation themselves. This they did, and the Clean Air Act became law in 1956.

Whereas previous legislation in the form of the Alkali Acts which had required the best practicable means to be used to reduce the emission of obnoxious or offensive gases from scheduled processes, and the Public Health Acts provided a means whereby the emission of smoke could be dealt with by common law action as a nuisance, the Clean Air Act now provided specific legislation regarding the control of air pollution. So far as domestic smoke is concerned the Act introduced smoke control areas which could be established—there was no compulsion—by local authorities under an order requiring Ministerial approval. Under this section of the Act too, provision was made for a grant towards the cost of converting grates and appliances etc., for smokeless use. The Authority could—and still can, of course—recover part of the grant from the central Exchequer; normally the cost of conversion is shared, the owner or occupier and local authority paying 30 per cent each and the Exchequer 40 per cent.

So far as industry was concerned definite regulations were issued regarding the emission of dark smoke. New furnaces were required to be as smokeless as practicable and all furnaces were required to be fitted with devices to minimise the emission of grit and dust. Railway engines and ships in specified waters became subject to the same controls regarding smoke as buildings. Penalties for offences in contravention of these provisions of the Act were specified.

This legislation was undoubtedly a great advance; but as it came to be applied, it was found that there were loop holes, and in 1968 Mr. Robert Maxwell, M.P., introduced a further Clean Air Bill. This Bill received Royal Assent in October 1968 and certain clauses of the Act were brought into force on 1 April 1969, and the remaining clauses came into operation on 1 October last.

To be known with the 1956 Act as the Clean Air Acts 1956 and 1968, the new Act supplements, extends and in part repeals the provisions of the 1956 Act. Although it contains considerable powers under which local authorities will be able to act immediately the Act is to a large extent a piece of enabling legislation by which the Minister of Housing and Local Government will be able to make regulations and orders further increasing and restricting its effect, providing exemptions from certain provisions and also repealing some local acts. The new Act, for example, gives the Minister power to direct a recalcitrant local authority to prepare and submit proposals for making and bringing into operation one or more smoke control orders. Hitherto, it was left to the local authority to decide whether or not they would introduce such controls.

The regulations regarding grit and dust are tightened up; the regulations regarding chimney heights are more stringent. The exemption of registered Alkali Act premises from the smoke, grit and dust provisions of the 1956 Act are extended.

The 1968 Act has not gone as far as everyone would wish, and it is still too early to try and assess its effects. Nevertheless, it is certainly a major step in the right direction.

In other countries legislation on air pollution has followed different patterns. In the summer of 1964 a European Conference on air pollution, called by the Council of Europe, was held at Strasbourg. The United Kingdom was represented by a strong delegation of experts and administrators. One of the results of this Conference was the setting up by the Committee of Ministers of a committee of experts on air pollution to make a study and comparison of the legislative and administrative measures in force in the various member states for the control of air pollution, with a view to the possible standardisation of such measures. This committee on which the British Government were represented by delegates from the Ministry of Technology and the Ministry of Housing and Local Government, decided to draw up a declaration of principles for the control of air pollution which would serve as a guide line for legislative and other action by member countries.

This declaration was completed in 1967 and submitted to the Committee of Ministers, who by a resolution adopted on 8 March 1968, approved it, recommended the Government and member states to bear in mind the principles set forth in the declaration when framing legislation or regulations in the matter of air pollution, and asked them to give the declaration the widest possible publicity. The declaration is not in itself a statement of British Government policy, but the Government endorses it in general terms. With the exception of the provision for European standards for motor vehicles and fuel burning appliances and for pollution in frontier areas, the practice in the United Kingdom accords with the principles set out in the document.

In the United States a Clean Air Act was passed in 1963. This was the first federal measure for the control of air pollution; it reaffirmed the policy of state and local responsibility for control activities but authorized the Department of Health, Education and Welfare to undertake many new supporting activities. Under amendments enacted in 1965, national standards for the control of motor vehicle pollution were established.

In 1967 the Air Quality Act was passed. Under this law, control remains with the state and local authorities and it is described as "a blue print for a systematic effort to deal with air pollution problems on a regional basis". It calls for co-ordinated action at all levels of government and among all segments of industry. The system, which this new legislation develops, hinges on the designation of regions where two or more communities—either in the same or different states—share a common air pollution, and on the development and implementation of air quality standards to such regions. Since the passing of this legislation the H.E.W. Department has been publishing a number of air pollution criteria and States have begun to develop air quality standards and plans for their implementation.

Japan uses yet another method; in 1967 the Japanese Government passed a law on basic counter-measures to public nuisance. This Act as we would call it, has the purpose of integrating counter-measures on a national scale to what it terms public nuisances. Air pollution is designated as such a



nuisance. The responsibilities of the national government, local authorities, industry and private citizens are defined in general terms and the Government is required to report progress each year to the Diet. The Government is responsible for laying down environmental standards generally, and for stipulating limits on emissions by industry; it has the power to enforce systems of surveyance and surveillance and measurement of pollutants and is generally responsible for education and propaganda. Local authorities are required to implement these policies in the areas for which they are responsible. Industry is required to bear either the whole or partial cost of the work of alleviating nuisances, but there is also provision for national taxation to raise money to be spent by local authorities on this work as well.

The Declaration of Principles on Air Pollution discussed earlier makes special mention of motor vehicles.

In this country, there is little or no legislation as such regarding pollution from motor vehicles. There is no legislation regarding pollution from petrol engined vehicles—the main pollutants being carbon monoxide and hydro carbons—but certain statutory regulations regarding emission of smoke or other forms of pollution from diesel engined vehicles have been issued by the Minister of Transport under the Road Traffic Act.

These regulations provide that vehicles shall be so constructed that no avoidable smoke or visible vapour is emitted from them, and they prohibit the use of the excess fuel device while the vehicle is on the road.

On the other hand, the legislation regarding road vehicles in the United States is much more comprehensive and extremely stringent. The standards required for 1970 vehicles limit exhaust emissions from automobiles and light trucks to 2·2 grams of hydrocarbons and 23 grammes of carbon monoxide per vehicle. Cars and light trucks are required to control 90 per cent of the evaporation of hydrocarbons from gas tanks and carburetters. 35 per cent of hydrocarbons and 37 per cent of carbon monoxide are to be controlled from the exhausts of gasoline powered heavy trucks and buses. And for all vehicles, the regulations prescribe a 100 per cent elimination of crankcase emissions.

There is little legislation regarding petrol engines as yet on the Continent, but Sweden is introducing legislation similar to that in the United States in the very near future, and Belgium has legislation regarding diesel vehicles.

**Table 2.**  
**Estimates of Pollutants from Road Vehicles in Great Britain in 1967 in Millions of Tons**

	Consumption of Motor Spirit	12·084 million tons
	Consumption of Derv Fuel	4·286 million tons
<i>Pollutant</i>	<i>Petrol Engines</i>	<i>Diesel Engines</i>
Carbon monoxide	5·7	0·09
Hydrocarbons	0·28	0·017
Aldehydes	0·01	0·003
Oxides of nitrogen	0·19	0·05
Sulphur dioxide	0·02	0·03



The estimated quantity of carbon monoxide discharged into the air from the other industrial and domestic uses of all fuels in 1967 is about  $10\frac{1}{2}$  million tons, of which nearly five million tons was from domestic heating appliances.

To sum up, in this country we now have legislation dealing specifically with air pollution from the chemical processes, from industry, from domestic sources, from railways and from ships. We have limited legislation with regard to road vehicles.

### **Air Pollution in the United Kingdom Today**

What effect has this legislation had, how much of the reduction of pollution in recent years is due to legislation and how much is due to a social revolution and education? These are very difficult questions to answer. Undoubtedly, education and enlightenment have played a big part in what has been achieved; but legislation has also played a major part. Industry started to put its house in order before the Clean Air Act was passed and this was largely done for economic reasons. To burn fuel efficiently saved money. On the domestic front, although there were a few smokeless zones before the Clean Air Act was introduced, it has really been the effect of this Act which has done much to reduce smoke from domestic sources—although there is still far too much. Domestic smoke is still responsible for 70 per cent of the whole.



Coventry—Smokeless Zone  
(By kind permission of the Coventry Evening Telegraph)



Table 3 shows the present estimates of air pollution from smoke and sulphur dioxide, and the trend in the last 30 years.

**Table 3.**

**Estimates of Air Pollution by Smoke and Sulphur Dioxide from the Main Uses of Fuels in Great Britain in 1938, 1956 and 1967 in Millions of Tons**

*Estimates prepared by Dr. Albert Parker, C.B.E.*

<i>Year</i>	<i>1938</i>	<i>1956</i>	<i>1967</i>
<b>Smoke</b>			
<b>Coal</b>			
Domestic, including miners' coal	1.71	1.26	0.75
Railways	0.26	0.24	0.02
Industrial, etc	0.74	0.75	0.10
	<hr/> 2.71	<hr/> 2.25	<hr/> 0.87
<b>Sulphur Dioxide</b>			
<b>Coal</b>			
Domestic, including miners' coal	1.21	0.90	0.59
Electricity supply industry	0.40	1.23	1.88
Railways	0.36	0.33	0.02
Collieries	0.32	0.21	0.08
Industrial, etc.	1.33	1.47	0.89
Coke ovens	0.07	0.11	0.08
Gas supply industry	0.14	0.20	0.10
	<hr/> 3.83	<hr/> 4.45	<hr/> 3.64
<b>Coke</b>			
Domestic, including other manufactured solid smokeless fuels	0.06	0.08	0.14
Industrial and miscellaneous	0.18	0.27	0.14
	<hr/> 0.24	<hr/> 0.35	<hr/> 0.28
<b>Oil</b>			
Domestic	—	—	0.01
Industrial (a)	0.05	0.47	1.96
Road and Rail transport	0.01	0.03	0.08
Marine craft (inland)	—	0.03	0.04
	<hr/> 0.06	<hr/> 0.53	<hr/> 2.09
Overall total (b)	<hr/> 4.13	<hr/> 5.33	<hr/> 6.01

- (a) The amount of 41.5 million tons of oil used in 1967 for industrial purposes (Table 1) is equivalent in heating value to about 70 million tons of coal, which if used for the same purposes would have produced about 0.2 million tons of smoke, 0.2 million tons of grit and dust and about 2 million tons of sulphur dioxide.

- (b) In general over the period 1938 to 1967 the rise in the quantity of sulphur dioxide discharged has been approximately in proportion to the rise in the coal equivalent to the energy consumption; but there has been a decline from 6.43 million tons in 1965 to 6.28 million tons in 1966, and 6.01 million tons in 1967, and in the amount expressed as a percentage of the total coal equivalent. With further increases in the uses of nuclear electricity and of natural gas and decreases in the sulphur content of industrial fuel oils, partly with changes in the sources of the oils, there will be further reductions in the amount of sulphur dioxide discharged into the air. With the decrease in the amount of sulphur dioxide discharged from low domestic chimneys and from railway engines and the move towards higher chimneys for installations burning large quantities of coal and industrial fuel oils, there has been a reduction in the concentration of sulphur dioxide in the air near ground level; this reduction will continue.

The National Survey shows that in the last 15 years over all the country there has been a 55 per cent drop in the amount of smoke emitted. In the north of England there has been a reduction of 45 per cent, while in the south the reduction is between 60 per cent and 65 per cent, and in London itself it is between 70 per cent and 75 per cent.

Similarly, there has just begun to be a reduction in the total amount of sulphur dioxide emitted and that in the ambient atmosphere at breathing level continues to reduce. In the north there has been a reduction of 45 per cent while that in London is of 20 per cent only. This reduction has been achieved by taking full advantage of natural dispersion processes and the use of high stacks. Table 3 shows that for some years emission of sulphur dioxide increased; although it is now decreasing, much is still emitted and it must go somewhere—even though the use of high stacks keeps it out of the air we breathe—and air knows no frontiers. The problem of sulphur dioxide is not solved. Dispersal is not a cure; it is a palliative only.

Much has been achieved and this has not been done without considerable cost to industry, to the private consumer, to the Exchequer. It is estimated, for example that in the current decade the Central Electricity Generating Board's expenditure on clean air will total some £124 million and by 1970 will have reached an outlay of about £17 million per year. The major part of this sum is expended on dust extraction and disposal. Similarly, other large industries such as I.C.I. spend vast sums each year on the reduction of pollution. The potteries, which a few years ago used coal for their firing—and this was a very inefficient means and did cause a lot of black smoke—now use oil and are rapidly going over to the use of natural gas which is completely smoke and fume free.

Because of all that has been done there is now no doubt that we all enjoy cleaner air and much more sunlight in our cities. This has made it worthwhile to clean the buildings, and previously where shrubs like privet and laurel would grow, to plant flowers. In the City of London pomegranates now grow in Bunhill Fields and what were formerly Victorian type shrubberies now bloom with azaleas, camellias, rhododendrons and heather.



Birds which have not been seen for years are now in our cities. Striking a more personal note, one's linen does not get dirty so quickly. And even Carnaby Street considers it can now use lighter coloured fabrics for its "gear".

It must not be imagined, however, that all our troubles are yet over. Much yet still remains to be done. Certain industries present problems. In some instances, the technical knowledge is available but the cost of fitting the necessary equipment in the form of arresters and cleaners is prohibitive. In iron and steel works for example much more could be done. A lot has been done already, and Sheffield is now one of our cleanest cities. Equipment does exist but it is expensive. The accompanying photographs show a cupola at Thames Foundry before suitable sophisticated cleaning equipment was fitted and what has been achieved by the fitting of this equipment. But the initial outlay was close on £1 million and the equipment costs many thousands of pounds a year to run. If smaller equipment were fitted to every cupola in the country the cost would be enormous and the cost of our steel would go up. The question remains; can we afford to do this—or can we afford not to do it?



Thames Foundry—The cupolas as they used to be

Cement works present another problem. In the newer works a great deal of money has been spent on fitting sophisticated electrostatic precipitators. When these are working properly some 99·8 per cent of the grit and dust is arrested. Unfortunately globulation occurs and the arresters do not always work properly with unpleasant results for those who live in the vicinity of the works. Brickworks still present a problem and so do oil refineries.

In the domestic field a steady increase in the number of smoke control areas brought into operation was indicated until March 1968. The figure for the year ending 31 March 1969 was some 15 per cent less from that of the previous year and this year's figures show a further drop. This indicates a big reduction in the advance of smoke control in the past two years. Although this is probably accounted for by financial stringency, it is nevertheless a retrograde step which can only be deplored. It was to be hoped that the current year would see the position restored, especially now that the Minister of Housing and Local Government has been given powers under Section 8 under the 1968 Clean Air Act to direct laggard authorities to institute smoke control areas. But the current shortage in supplies of solid smokeless fuel has already resulted in the suspension of smoke control orders by a number of authorities; and the situation may well get worse before it gets better.



Thames Foundry—The cupolas as they are now



## Research

A great deal of research on air pollution, financed directly or indirectly from public funds, is being carried out by four organisations:— the Ministry of Technology's Warren Spring Laboratory, the main Government Laboratory responsible for air pollution research other than medical research; the Medical Research Council, responsible for research on medical effects of air pollution; the Atomic Energy Research Establishment at Harwell which entered the field of general air pollution research two years ago and whose programme in this field is planned in consultation with the Director of the Warren Spring Laboratory; and the industry which as the largest single user of fuel devotes much effort to pollution control, the Central Electricity Generating Board. Much research is also being carried out by industry and by universities, colleges of technology and technical colleges throughout the country.

The Warren Spring Laboratory conducts a national survey of pollution by smoke and sulphur dioxide. This involves daily measurements at over 1,200 sampling sites in some 450 urban and rural areas. The survey was designed to assist the progress of Great Britain towards clean air and to discover where the need for remedial action was most urgent. The Laboratory is also concerned with the abatement of emissions of oxides of sulphur and fluoride compounds from brickworks. It is also carrying out research on pollution from motor vehicles, in consultation with the Minister of Transport and the motor industry; this research is directed towards helping to provide the basis for legislative control of exhaust gases.

The Air Pollution Research Unit of the Medical Research Council is carrying out research on a number of subjects connected with the effects of pollution on human beings. In the field of epidemiology, the Unit's efforts to determine whether the marked improvement in pollution conditions in London during recent years have led to any corresponding improvement in health, are continuing.

There is now little evidence of any association between daily death rates, hospital admissions and pollution. This, the Unit states, is due largely to the absence of periods of high pollution in recent years. It is not expected that smoke will reach high values any more but there is good reason to believe that high concentrations of sulphur dioxide would still occur in temperature inversions. Studies on chronic effects also show encouraging signs; bronchitis mortality is beginning to decline again particularly in London, and although the improvement may be due partly to changes in tobacco-smoking habits and to improved therapy, the situation is being watched carefully in relation to changes in pollution.

The Atomic Energy Research Establishment at Harwell has, among other research, been carrying out a survey on Teesside to ascertain whether there is more fog and mist there than can be ascribed to geographical and meteorological factors alone; and if so whether the cause is associated with any particular atmospheric pollutant.

The Central Electricity Generating Board has been carrying out work on dust instrumentation, an area of research where the Board blazed the trail. Work is now proceeding on ash disposal, the separation of solids from gases, and the dispersion of gases from the very high stacks.

I will not attempt to summarise the work being done by industry and in the various universities and colleges throughout the United Kingdom, but it is considerable.

As is to be expected, much research is also being carried out in America and in other parts of the World. The European Federation of Chemical Engineering have recently issued a report on air pollution by the working part of the European Federation of Chemical Engineering and a directory of establishments in Europe engaged on air pollution research; this publication gives a very comprehensive outline of what is being done.

### **The Future**

Looking into the future is never easy. But it now seems that we have reached the position where we know how to conquer domestic smoke and where industry is making steady progress. It was originally hoped that all the black areas in the country would be smoke controlled by the early 70s. This will not be achieved, and it seems much more likely that it will be the late 80's or even the 90's before we reach this stage. Even so, albeit slowly, domestic smoke is on the way out. In the case of industry, it is to be hoped that money will be found to continue research and implement the improvements necessary to what I have called the "black spots". Sulphur dioxide is a problem still: we have not "cured" it, we have only used a palliative. Personally I hope that by the end of the century we shall have little trouble from these sources, but I am convinced that if we do not take legislative action about the motor car very soon, then much of the good that has already been achieved and is being achieved will be undone.

Here we have a situation where the British motor industry has the technical know how and capability of building cars for the American market where the regulations regarding pollution from exhausts are extremely stringent, and yet we cannot introduce legislation regarding properly fitted cars in this country because there is as yet no medical evidence that the carbon monoxide emitted is dangerous to health.

Although there may be as yet no medical evidence to show that exhaust fumes are harmful in the concentrations in which they are met in the street, it is apparent to any thinking person that on the grounds of amenity alone, action should be taken.

The United States of America consider that they introduced their legislation some 14 years too late. If legislation were introduced in this country now it would probably be 1973 before the first cars, suitably fitted, came off the production line. If one gives the average car a life of between 7 and 10 years then it is going to be 1980 to 1983 before any real effect would be felt. The motor car population is increasing; what its exact size will be in 1980 is difficult to forecast but it will certainly be considerably more than it is now. I do not believe we can afford to wait any longer before we take action.

To those people who live near our airports or on the approach routes to them, aircraft constitute a problem. There is no doubt that modern jet engines, under certain conditions, do emit unburned kerosene and smoke



and this does pollute the atmosphere. Although this may not constitute as large a problem as that of the motor car, it is one that should be tackled early before it gets out of hand.

The particular form of air pollution which I have so far not mentioned specifically is that of odours. It could be said that odours range from "scents" to "stinks". We are all aware both of unpleasant and pleasant smells and it is the unpleasant smells with which action is needed. Here again there is a slight problem. Some people find certain scents objectionable; others do not. Nevertheless, there are certain smells which are objectionable to all. The most efficient smell detector is still the human nose and this often adds to the difficulty of tracking down the sources of unpleasant smells. Another difficulty is that one soon becomes used to a smell; those who work in the vicinity of what to passers-by is an unpleasant smell, do not notice it themselves.

One would not wish to eliminate the smell of newly baked bread from an old fashion bake house; on the other hand, one would wish to eliminate the unpleasant cooking smells that come from kitchens of certain catering establishments. To most of us the scent of new mown hay is pleasant, that of the mercaptans which mistakenly escapes from an oil refinery, is not.

Action can be taken against unpleasant odours on the grounds of nuisance and many local authorities are busily engaged in this. Generally, the co-operation from industry, especially the large organisations such as oil refineries and chemical works is good. Such organisations do their best to make certain that smells are eliminated as much as possible—but they do not win all the time.

Little research has so far been done on this problem but it is one which the Society is examining and one in which the Warren Spring Laboratory are becoming interested and taking action. It is to be hoped that this further activity will do much to improve the situation.

To some people, noise is a form of air pollution; to others it is a nuisance by itself. Whether we regard noise as being a form of air pollution or not, it is something which cannot be disregarded. It is probably one of the greatest and increasing problems of present day life. So far, little legislative action has been taken in this country. It is true there are certain regulations regarding the noise from motor vehicles, but I personally have never heard of a prosecution under these regulations. On the other hand, I am very aware, as I am sure many of you are, that a considerable number of the motor vehicles on our roads are offenders against this legislation. This is another problem on which more research and action is required.

To talk of waste disposal may seem rather out of place here, but it has distinct bearings on air pollution. The increasing amount of waste and rubbish generated by modern living is causing considerable problems to authorities all over the World. It is not my province to examine this problem in any depth, but simply to mention that one of the ways in which rubbish can be effectively disposed of is by incineration; and unless such incineration is properly carried out it can be a serious form of air pollution.

The garden bonfire may be a nuisance to ones neighbours—and in some cases of course it is forbidden by law—but the large incinerator burning old motor tyres, unless it is properly constructed and fitted with the necessary after-burners, can constitute a serious form of nuisance and pollution.

A case occurred not so long ago in which a local authority complained to the local junk merchant that he must get rid of a pile of old motor tyres stacked on his premises. He suggested that the best way to do this was to burn them, but it was pointed out to him that his yard was in a smoke control area and he could not do this. However, with co-operation from the authorities concerned it was arranged that the tyres should be burned in a disused quarry some distance from the town. This was done and the smoke and odours released as a result were dispersed away from dwellings. But it was found shortly afterwards that the town's water supply was contaminated. The contamination was traced to the melting rubber and other impurities entering a catchment area through cracks in the floor of the disused quarry where the tyres had been burned.

This will serve as an illustration to show that the problems of air pollution cannot be tackled in isolation. There is inter-relation between clean air, clean water and clean soil. It is useless if water is used to wash the pollutants out of air and the dirty water, the effluent is put into settling tanks and the water run off and the sludge removed, what is done with the sludge? Too often it is spread on the earth with unpleasant results.

The problem of the disposal of waste can be said to epitomise the whole problem of the preservation of the environment. Pollution of the air is caused by waste gases; pollution of our rivers and water supply is caused by the discharge into them of other wastes; contamination of our soil can be caused by the methods we use to clean the air and water. In the realm of clean air, I consider that we have made considerable headway; but if this is at the expense of the contamination of our rivers and of the soil, we are only half tackling the problem.

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# **New Offices for the Society**

**134/137, North Street, Brighton**

*Telephone No 26313/4/5*

The Society have acquired new premises at 134/137 North Street, Brighton, and it is planned to open the new offices for business at 09.00 on Monday, 13 July, the move from London having been made over the preceding weekend. The present premises in Breams Buildings will be closed at 12.00 on Friday, 10 July.

All members are asked to make a special note of the new address and telephone number.

The lease on the present offices in Breams Buildings will expire on 29 September 1970 and it is now over a year since a Premises Sub-Committee was appointed and met to look into the whole question.

The Society's present landlords indicated that they would be prepared to renew the lease but at a very greatly increased rent and with only six months' security of tenure. Enquiries in London soon showed that if the Society were to stay in London, it would almost certainly be necessary to pay about £5,000 a year in rent alone. This was not economically feasible, and it was decided to look outside London for premises at a lower rent but within easy reach of London as it was considered that the Society's contacts with London should not be severed.

The staff also had to be considered. Some were prepared to move from London; others were not. The hope, therefore, was that the Society would still be able to find suitable premises at an economic rent in London, and the impetus of the search there was stepped up. But again without result.

By this time the Steering Committee had superseded the original Premises Sub-Committee. Premises in Farnham, Farnborough, Guildford and Woking were considered. However, at these places, the question of available housing for staff prepared to move had also to be taken into account, and difficulties were encountered.

Brighton was then considered. Premises were available at what, compared with those asked in London, were very reasonable rents. Housing for staff was less difficult; replacement staff for those unwilling to leave London were available; Brighton is a conference town frequently visited by members of the Society, and it is only 55 minutes from London with a good train service, and is near Gatwick Airport. The Steering Committee therefore recommended to the Executive Council that the Society should take premises in West Street, Brighton. The Council approved this move by a majority vote, and negotiations were put in hand.

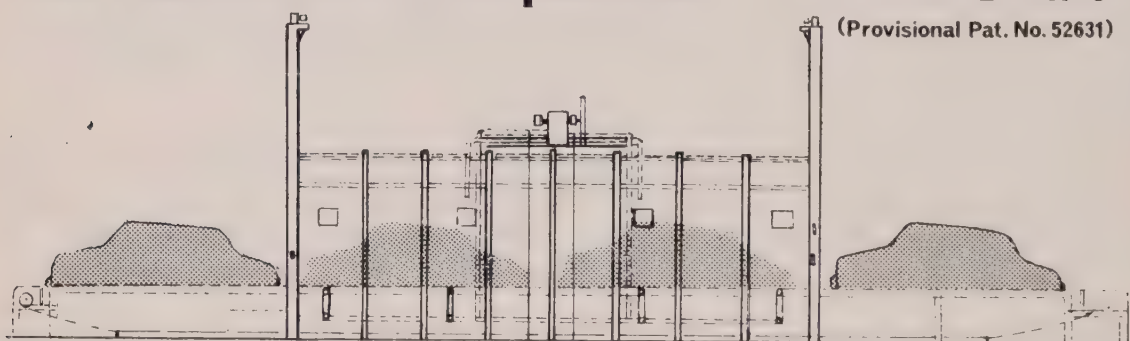
All was going well when the Society were suddenly informed that the premises would not be available because the owners had changed their mind and had decided to retain the West Street premises for their own purposes. This was a blow, but immediate action was taken to negotiate for other suitable premises known to be available in North Street, Brighton. These negotiations have proved successful and the move to them will be made, as previously stated, on the weekend of 11 and 12 July.

The new premises are modern, prestige offices and are very light, airy and commodious and extremely well suited to the Society's purposes. For convenience of members, Council and Committee meetings will be held in London as heretofore. But it is hoped that members when they are in Brighton will use the facilities at the new offices and visit the staff there.

Remember please; the address is 134/137 North Street, over the District Bank, near the Clock Tower and five minutes walk from the station.

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# The Protection of the Environment—The Fight Against Pollution

*The Government White Paper, May 1970*

After an introduction which points out that this White Paper is about Man's impact on his environment and "the degrees of control we can exert over that pollution is a major factor in the quality of our civilisation", the paper considers pollution under the following headings:

Pollution of the Air

Pollution by Noise

Pollution of the Land

Pollution of Fresh Water

Pollution of the Sea and Beaches

Pollution by Radioactivity.

The paper then has a short section on International Work and a Conclusion.

The Introduction or first chapter of the White Paper lists three factors as being necessary for improved environmental control: better scientific and technical knowledge, economic priorities and economic decisions, and the correct legal and administrative framework. But "there is also a fourth, and that is the will to do the job. Government can and must give a lead. But success will also depend on an increasingly informed and active public opinion." This last is something that this Society has pioneered, not without success, in the cause of clean air for over seventy years: and it is ironic that such a statement should be made in a White Paper published at a time when the progress of clean air has received a severe set-back because of the shortage of solid smokeless fuel.

So far as International Work is concerned, British Government Policy is summarised as follows:

"(a) To take part in all the categories of work listed in the organisations most appropriate to each project;

(b) to encourage progressive rationalisation of this work so as to avoid duplication of the same work in different organisations;

(c) to establish common ground with other industrial countries on the problems and methods of environmental pollution control which are common to those countries;

(d) to do what is possible by trade, by aid and by advice, to assist the developing countries to expand their economies and handle their environment without repeating the mistakes which have been made by the developed countries over the last 150 years;

(e) to seek international standards for pollution control which will help to smooth the flow of international trade and to avoid interruptions of normal trading patterns through sudden and unexpected changes."

By far the largest section of the White Paper is devoted to Pollution of the Air which is considered under five headings:—

- Pollution by domestic smoke,
- Industrial pollution under local authority control,
- Industrial pollution under central government control,
- Pollution by motor vehicle exhausts, and
- Global Air Pollution.

### **Air Pollution by Domestic Fires**

“Domestic coal fires are still the worst source of smoke in this country. Coal smoke has been proved to aggravate respiratory disease, and when it comes out of the chimneys of ordinary houses it hangs about at low level and so people breathe more of it.”

The working of the Clean Air Acts is then briefly explained together with grant arrangements. “In 1964-6 public expenditure in Great Britain on this smoke control grant was £2.2m. In 1969-70 it was £5.1m.”

The paper then recognises that “last winter there was a tight situation in the supply of solid smokeless fuels” and continues “The Government have taken the following action to meet this situation. Certain unprofitable older gas works will be specially kept in production. The National Coal Board will increase their supplies; for example, 150,000 tons of briquettes will be made from Welsh anthracite duff. Steps are being taken in the public sector, notably in schools, to convert coke-burning boilers to other forms of heating. As a result of these actions more coke will be available for the domestic sector.

When this temporary difficulty has been overcome the Government will intensify the drive for cleaner air, to which they are fully committed. Additional money will then be allocated for grants for smokeless areas and the Ministers concerned will be ready at the appropriate moment to use their powers to compel laggard local authorities in badly polluted areas to make smoke control orders.”

The question we ask is when will the difficulty be overcome?

### **Industrial Air Pollution Under Local Authority Control**

Local authority control covers all industry not under the control of the Alkali Inspectorate and covers more than 30,000 industrial premises. The White Paper outlines briefly the powers of local authorities. It continues “the Government will shortly introduce regulations prescribing limits for the amount of grit and dust which may be emitted from various types of furnace chimney”. It promises that “within the general programmes for rebuilding and modernisation” of Crown Buildings (which are exempt from the Clean Air Acts) “the Government will continue to improve standards of smoke emission”.

### **Air Pollution Under Central Government Control**

The White Paper explains the functioning of the Alkali Inspectorate and quotes the figures, given in the 1968 report of the Chief Alkali Inspector, spent by scheduled industry on air pollution control during the decade 1958 to 1968, in all, some £150m of capital expenditure (these figures will



be reproduced in the new Clean Air Year Book to be published shortly). It continues "The Government propose shortly to lay before Parliament Orders to schedule under the Alkali Act processes in primary aluminium works, acrylics works, di-isocyanates works, mineral processing, and certain processes not now scheduled in the petroleum industry. This extension of central Government control will be accompanied by a gradual tightening up of the standards required of scheduled industry as a whole by the Alkali Inspectorate."

Vigilant watch is also being kept on the emission of sulphur dioxide and it is noted that the total SO<sub>2</sub> emission has steadily fallen since the peak of 6½m tons a year in 1963-65. In the past decade, concentrations of SO<sub>2</sub> at low level have fallen even more sharply: "the average concentration in towns has fallen by some 33 per cent."

### **Air Pollution by Motor Vehicle Exhausts**

The White Paper starts by recognising that the control of air pollution from motor vehicles is "an exceptionally complicated matter".

For diesel engined vehicles, a new British Standard (BS/AU141) has been agreed between the Ministry of Transport and the diesel engine manufacturing industry which permits less smoke from heavy vehicles, and "The Minister of Transport will shortly lay regulations to make this Standard obligatory for diesel engines installed in new vehicles, and he is now discussing with the industry and the British Standards Institute a tightening of the Standard which will in due course still further reduce the permitted intensity of smoke." This is something that the Society have been urging for some considerable time.

For petrol engined motor cars, the Minister of Transport will shortly lay statutory regulations to require that all new vehicles sold in this country should be fitted with a simple "breathing" device which will feed the crank case emission of hydrocarbons from unburnt and partly burnt fuel back into the air intake to the cylinders. This, it is claimed, reduces the hydrocarbons emissions by some 25 to 30 per cent and will help to reduce the smell.

The White Paper points out that the climatic conditions of Los Angeles are peculiar to that city, and the air pollution from petrol engined vehicles in Europe presents "a different and less acute problem, and the development of a completely pollution-free car might not be the most sensible use of resources. But the Economic Commission for Europe has prepared a standard which member countries *may* (the italics are ours) adopt to control emissions from petrol-engined vehicles". The Government will carefully consider all aspects of the question before deciding whether to introduce this standard. It is to be hoped that they will introduce such a standard as this will be a considerable step in the right direction and one which the Society has urged for some years.

The Government state that they will keep the question of lead under review and finally acknowledge that the number of cars on the road "may be expected to increase for a considerable period ahead. It is the Government's aim progressively to reduce and where feasible to eliminate the substances in vehicle exhausts which are harmful to the environment. This will take many years and, in the meantime, a steady tightening up of

standards of pollution control, beyond the measures described above, will be undertaken."

### **Global Air Pollution**

The Paper comments on the current discussion of the apparently conflicting possibilities regarding the increase of carbon dioxide in the atmosphere which may cause a slight general warming of the earth on the one hand, and on the other, the increasing amounts of dust in the upper atmosphere which may cause a slight general cooling of the earth. This matter will be referred to the Royal Commission who "will play an active part in the international organisations considering these matters."

Noise, pollution of the land, of fresh water, the sea and beaches are not within the Society's present terms of reference and space will not allow of their consideration here. But pollution by radioactivity is our province. The chapter of the White Paper dealing with this acknowledges that the disposal of radioactive waste is the main problem, but states that, even though this will increase substantially in the long term, this is well under control and the Government do not foresee difficulties in the future.

As a Society we welcome the publication of this White Paper and express the hope that the intentions stated therein will soon become law whichever political party is returned to power.

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## **ANNUAL CLEAN AIR CONFERENCE SOUTHPORT**

**20-23 October 1970**

*See Page 335 for full Conference Programme*

**HAVE YOU REGISTERED AS A DELEGATE?**



# LETTERS

*The Editor,  
Smokeless Air*  
Sir,

Your Editorial in No. 153 of SMOKELESS AIR deals with the shortage of smokeless fuel, which Lord Robens warned recently would be 140,000 tons next winter, on a domestic demand of 8m tons per year.

The N.C.B. Chairman urged the Government to defer its smokeless zone programme (in conservation year!) because there was not time to get planning permission and the engineering work for new plant, but I wrote to *The Times* suggesting that from my experience he had a simple problem. My letter was not published, and you might be interested in having the facts.

Some time ago I ordered domestic smokeless fuel: the first delivery contained  $12\frac{1}{2}\%$  moisture, the next one 19.6%.

In the subsequent discussion I was told there is no statutory limit to the moisture content of smokeless fuel, that "bone dry" it would be impracticable (though I find it is perfectly amenable to draught control), that 8% moisture is necessary for controlled burning and that 12% moisture was not considered excessive.

Assuming that the 8m tons had the acceptable moisture content of  $12\frac{1}{2}\%$ , it would be possible to make up the tonnage shortage with 140,000 tons of water alone, and yet the saleable product would be drier than the second delivery I received.

Actually, it appears that the moisture in deliveries to merchants is in the region of 25%, so that Lord Robens should be able to solve his problem without either mechanical plant or governmental indulgence.

Yours faithfully,

T.E. DIMBLEBY,

*Dunston,  
Adderbury, Oxon.*

*The Editor,  
Smokeless Air*  
Sir,

May I reply to the letter of Mr. G. B. Stokes on the N.C.B. Housewarmer in your Spring issue?

For the past year the Housewarmer has been undergoing a carefully controlled market test mainly in the Central Midlands, and so far 1,000 appliances have been installed and further installations are planned in the immediate future.

The appliance has received exemption under the Clean Air Act following careful examination of test results on smoke emission by the Ministry of Housing and Local Government. Following the reports of excessive smoke emission at Carlton, however, a programme of site observations was undertaken jointly by the Carlton U.D.C. and N.C.B. in conjunction with the Warren Springs laboratory acting on behalf of the Ministry. The results

showed that 80.47% of the observations could be classified as "no visible smoke". The further 13.7% of the observations could be classified as "light smoke", defined as smoke which would be invisible from a distance.

The installation of Housewarmers on the estate at Carlton was carried out during the summer and autumn and there was general tenant satisfaction until the onset of cold weather when complaints began to be received both on grounds of condensation and inadequate heating. It was at this stage that the survey was undertaken independently by Carlton U.D.C. The N.C.B., as soon as the results were communicated to them, immediately put in hand a house-to-house examination. The results of this survey contained three major factors.

Firstly, before the Housewarmer was installed, two open fires were in operation, on which large tonnages of concessionary coal were burnt with a resulting very high radiant heat output. The change from these to a closed fire where much of the heat is by convection has undoubtedly caused dissatisfaction. The extent of this is shown by the fact that tenants have been complaining of cold even where recorded temperatures were well above 70°F. This criticism would have arisen from any high efficiency method of heating using a closed appliance and is one which should decline as tenants get more used to the new type of heating.

Secondly, the houses are of a concrete construction with a tendency to condensation. Although the system was carefully designed to minimise this, the change from two open fires to a single closed appliance has increased condensation in some cases because of the reduced number of air changes. This again would have happened with any high efficiency heating appliance and certainly the performance of the Housewarmer is far better than might be expected from an intermittent source of heating. Experiments have been made to find a solution by improving ventilation and by insulating external walls and these measures will be extended to all those houses where condensation is a significant problem.

Finally, it was clear that, despite careful guidance, many of the tenants have not been operating the fires correctly and this has reduced heat output. Further guidance is being given and follow up visits will be made to ensure that tenants are getting the best out of their appliance.

While there have been the inevitable teething troubles to be expected with any new appliance which have necessitated some modification to the Housewarmer, these have been, and will be, incorporated into appliances already installed and we are quite confident that the Housewarmer as it now stands is perfectly able to provide heating to Parker Morris standard in the smaller types of house which make up the majority of Local Authority housing. Meanwhile priority is being given to developing quickly larger output roomheaters embodying the same principles so that the whole market can be covered. It must be remembered that these appliances not only provide dramatically lower running costs than with any other solid fuel but because the fuel is in ample supply, overcome smokelessly the problem of the present shortage of smokeless fuel in many areas.

Yours faithfully,

GEOFFREY KIRK,

Director of Public Relations,

*National Coal Board,  
London, S.W.1.*



*The Editor,  
Smokeless Air*

Sir,

There are two points in Mr Draper's letter of your Spring issue with which I disagree. First, the effects of traffic fumes on health. It is not obvious at present what our priorities should be in relation to the gaseous components of exhaust. Carbon monoxide in small quantities appears possibly to have a sedative effect, and it may be that this is how cigarette smoking operates to some extent, for smoking can produce a CO level in the blood three times that due to a London traffic jam. Although we do not know this for certain, neither do we know whether it is the CO that is responsible for any headaches, irritability, slowness of reaction which are alleged or observed to occur as a result of traffic fumes. It could be that without the CO irritability might take charge and we should be worse off by getting rid of it alone.

Since CO is not detectable by the senses it is not a cause of damage to amenity, which the unburnt hydrocarbons and smoke certainly are. Since particulates are known to be harmful, and because smoky exhaust smells more objectionably than other exhaust, we can say that smoke reduction, which is quite feasible, is desirable from all points of view and should be given first priority in legislation. Furthermore, smoke elimination in all normal running is feasible.

But unless compression ratios can be substantially reduced, a reduction in invisible hydrocarbons almost certainly means an increase in production of oxides of nitrogen. These may be less objectionable but we cannot say that they are not more dangerous than the hydrocarbons: not yet anyway.

The advantage of traffic smoke elimination, from buses, taxis, trucks, invalid tricycles, scooters and old cars, will be that our standards of cleanliness will be raised, and this helps any clean air cause.

The second point is, unfortunately, a hoary one. Every time I argue for vertical exhausts on big diesel vehicles I am told that "it has been argued many times and it has been generally concluded that high emission is a disadvantage. But on investigation I always find that the argument is both second-hand and fallacious. I took the matter up with Mr Furness, of the Ministry of Transport; he persuaded me that it is probably too costly at present for buses, but there are no other good reasons and I expect that in a few years time when our standards rise we shall no longer think that way.

In so far as the matter was investigated from the point of view of other street users, the arguments against vertical exhausts on tall vehicles were quite erroneous, and I challenge anyone to produce a valid one. Let it be noted that refuse collection vehicles already have vertical exhausts for the purpose of reducing the exhaust concentrations to which people working around them are exposed, and the reasons for this are not invalidated when the vehicle moves; still less are they reversed.

Yours faithfully,

R. S. SCORER,

F.R.S.H., F.I.M.A., F.R.MetSoc.

*Imperial College of Science and Technology,  
London, S.W.7.*

*The Editor,  
Smokeless Air*

Sir,

Lord Robens said recently that the supply of solid smokeless fuel would worsen unless the closure of gas plants was slowed down. So far as this region is concerned there seems no doubt that the North Western Gas Board will finish producing solid fuel after this winter, and the Society should use its influence to see that the clean air programme does not grind to a halt.

Progress would be ensured if a standard grant could be paid to anyone prepared to change a coal fire (I am tempted to write a solid fuel appliance of any kind) to gas, electricity or oil. It is time to re-write our clean air legislation if we are to have smokeless air in our lifetime.

Yours faithfully,

K. WILLIAMS,  
Chief Public Health Inspector,

*Town Hall,  
Cheadle, Cheshire.*

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## Heating Engineers Study Pollution Effects

The Institution of Heating and Ventilating Engineers have announced the appointment of a Study Group on atmospheric pollution which will investigate and report on the effects of pollution caused by boiler plants and furnaces which provide heating, hot water and air conditioning services in Britain's commercial, industrial and public buildings. The Group will also be studying the polluting effects of chemical processes

Members of the Group include leading engineers and representatives from the fuel industries who will be examining these issues:

1. Present legislation on Clean Air: what it covers and what is omitted.
2. The attitude of local authorities. Are they taking reasonable steps to implement the existing law? If not, what problems do they face, including cost?
3. Steps being taken in other countries to control pollution.
4. Assessment of the significance of sulphur pollution.
5. Sulphur extraction from fuels before combustion.
6. Restriction of use of high-sulphur fuels.
7. Methods of absorbing sulphur from flue gases.
8. Relative importance of other forms of pollution.
9. Forms of pollution that may be dealt with in air conditioning plants.

The economic aspects will, as far as possible, be assessed in each section. Evidence will be sought from private companies and public bodies, including local authorities.

The Group, under the chairmanship of Dr. Frank Taylor, plans to publish its report early in 1971.



# REVIEWS

## **Advances in Environmental Sciences and Technology. Volume 1**

*Edited by James N. Pitts, JR, and Robert L. Metcalf. Published on 18 March 1970, by Wiley-Interscience: New York/London/Sydney/Toronto. 356 pages, 150s.*

Every mature person must be interested in this first volume of a new series of books that should help mankind to survive by overcoming the contamination of air, water, soil and food. Each of its nine chapters was recently specially written by different authors, who were chosen from U.S.A. experts in various branches of science, but all concerned with aspects of the environments in which people live. Light shines on the world's pollution problems from these nine facets but light is reflected as well as emitted so each chapter mirrors a point of view. Environment may be considered good or bad, depending on one's experience and habits, desires and wishes, expectations and ambitions.

The environments in which most people live have changed for better or worse, and will continue to change while we breathe, move and listen. Gone is the 17th century when from upper windows slops were emptied into London's narrow streets; and the 19th century when men dodged among the horsed buses and other vehicles to sweep up, with hand brush and pan, the smelly manure while flies swarmed all around. Gone is much of the grimey coal smoke that so moved the founders of the National Society for Clean Air. Those pioneers would have rejoiced to see this new book, whose object is to get our brains to contemplate environmental problems from many aspects.

People absorb facts that attract their attention, and when dedicated to some branch of science or administration lay their acquired knowledge in its appropriate pigeon hole, into which other folk may not enter. Hence the present need for books of this type that invite us, and help us, to look into many other scientific pigeon holes: to extract their hoarded facts of life; put them to work preventing our threatened extinction by pollution, and to bettering our environments.

Each of the nine chapters uses its own American-English scientific jargon, with words that are not to be found in the Oxford dictionary. To bridge the gaps between all these different disciplines most people will think that each chapter still needs a glossary of its specialist words and terms. Not understanding all these key words administrators, engineers and the all important municipal and parliamentary voters, will often fail to make practical use of the life saving facts known to this book's eleven authors.

The opening chapter, a joint production of the two editors, outlines environmental sciences: those enquiries into environmental quality resulting from the activities of man. It includes social, biological, physical and chemical factors. This global view of pollution includes frighteningly significant figures for population growth and unprecedented burning of fuels. In the U.S.A. alone 5200 million tons of carbon dioxide were emitted per annum,

it was estimated in 1965. Many estimations of the global distribution of man made contaminants are now available: such pollution crosses mere state boundaries.

The 1967 U.S.A. Clean Air Act therefore provided for control of air quality in Regions bounded by factors other than that country's arbitrary state lines. In Europe and elsewhere regional pollution control must be set up, similarly based on geographical and meteorological factors: not on existing boundaries or political and national prides.

Swedish experts have noted contamination of their air and water supplies by air pollutants from North British industries. An international treaty with Canada ordered all cities on the Great Lakes to stop discharging untreated sewage into boundary waters. Worldwide exchange of knowledge and experience is needed at once to prevent repetition of mistakes with pollutions, as more countries advance into urbanisation and industrialisation.

Sweden pointed out, in 1968, that certain parts of the world already suffer deterioration and in some cases actual destruction of their environments; and she therefore formally asked the United Nations to convene a World Conference on Pollution in 1972.

It is unwise to think of pollution solely in terms of air, and waste from urban industries. Recall that there are a billion domestic cattle in the world, and a cow generates as much manure as 16 persons. Per 1000 lbs of cow 17 lbs of phosphorus is excreted per annum. In adjacent streams, lakes and reservoirs this stimulates the growth of algae and other aquatic plants by increased levels of orthophosphate and nitrate. Decay of that abnormal growth increases the biochemical oxygen demand (B.O.D.) and fish and other aquatic animals find it then impossible to exist.

These changes in their surroundings, killing off previously normal living organisms, habits and modes of life are the ecological ageing named eutrophication. It must be more widely realised that wastes from large cities, and run off from agricultural lands treated with fertilisers have already made vast lakes in Europe and North America to be perishing, in the sense of the world's fundamental ecology.

In the chapter written by John Tunney, from the House of Representatives, Congress of the U.S.A., there is a succinct description of the position and events leading to abatement. The U.S.A. Federal Role in Pollution Abatement and Control started from its constitutional responsibility to promote the general welfare. The struggle with nature attitude of the early American pioneers gradually changed to the recently obvious use-and-discard economy.

That must now be changed to seeing a pollution-free environment as part of wise usage of all resources: other than the sun, energy from which is continuously supplied to the earth, so long as the atmosphere is clean.

The attention of all local and national government authorities should be drawn to John Tunney's final section on "the future": it points to major needs that are not being met.

Two most informative chapters consider Water Supplies. Firstly, from the pollution control and management, public health and hygiene points of view; and then from the biodegradable detergents and water pollution from the soap and detergent materials angle.

A large part of the book presents Californian researches into the parts



played by nitrogen dioxide, peroxyacyl nitrates, and singlet molecular oxygen in their unusual, serious air pollutions.

*Nitrogen dioxide* ( $\text{NO}_2$ ) has been found by the Statewide Air Pollution Center, University of California, important as a direct air pollutant, and involved in photochemical air pollution products. Consequently there has been much interest in the photolytic dissociation of  $\text{NO}_2$ : a study that since 1950 has made possible a revolution in gas phase photochemistry.

A discussion, in this chapter by Edward A. Shuck and Edgar R. Stephens, ends with 66 references and involves other oxides such as nitric oxide ( $\text{NO}$ ), nitrogen trioxide ( $\text{NO}_3$ ), nitrogen pentoxide ( $\text{N}_2\text{O}_5$ ), and nitrogen tetroxide ( $\text{N}_2\text{O}_4$ ).

But as  $\text{NO}_2$  is one of the more stable oxides it is well to focus on that. It exists in many urbanised areas where it is suspected of harming human health. By reducing the ability of plants to assimilate carbon dioxide it suppresses vegetable growth; and it appears to be five times as toxic as  $\text{NO}$ .

*Peroxyacyl nitrates* (PANs) are formed when sunlight acts on air polluted by organic compounds and nitrogen oxides. The ubiquitous motor vehicle emits both the above ingredients; sunlight photolysis converts them to peroxyacyl nitrates, whose biological activity can cause visible damage to agricultural crops when even parts per hundred million (pphm) by volume are measured. Minute concentrations, measured in parts per million to parts per billion range, can cause eye irritation: 100 to 200ppm. are lethal to mice in two hour exposure.

Its effects on plants, animals and humans and its characteristic damage symptoms have been noted throughout the U.S.A. and in other parts of the world. This form of pollution may have been thought of as solely Californian, but the writer of this chapter, Edgar S. Stephens, on the formation, reactions and properties of peroxyacyl nitrates (PANs) in photochemical air pollution, gives 27 references that show interest in this subject to have spread to other parts of the world.

*Singlet molecular oxygen* as an environmental oxidant is another photochemical air pollution discussed. With the aid of 109 references James N. Pitts Jr., reviews the characteristic effects of photochemical air pollution, that was first encountered in the mid 1940's in Los Angeles.

He stresses aspects familiar to photchemicals but not to researchers in other disciplines. Then he discusses in detail a highly reactive transient species, singlet molecular oxygen: thought to play an important role in the chemistry of urban atmospheres; and in their biological and health effects on man and his environment.

Members of his University of California, Department of Chemistry laboratories have recently concluded that the lowest electronically excited states of  $\text{O}_2$  may be hitherto unrecognised oxidants in test chambers and polluted urban atmospheres. So they review the spectroscopic and chemical properties of the two states of singlet oxygen; and give references to work on its electronic structure and spectra.

*Road vehicle air pollution* is described in a chapter that ends with 131 references, covering (A) General and Historical, (B) Catalyst and Exhaust Technology, (C) Automotive Technology, (D) Fuel Technology, (E) Analyses of exhaust gas and the atmosphere. Robert H. Ebel of the Stamford Research Laboratories, Connecticut, seeking the niche for catalytic devices,

has produced a helpful addition to the rapidly growing literature concerning the catalytic removal of potential air pollutants from auto exhaust. His eleven appendices list State legislation requirements, and many U.S. patents concerned with catalytic devices for oxidising hydrocarbons and carbon monoxide in exhaust gases.

The chapter on *Aeroallergens and Public Health* has been written by William R. Soloman, M.D., of the University of Michigan Medical School, whose work has been supported by a research grant from the National Center for Air Pollution Control, U.S.A. Public Health Service.

Many medical practitioners will find its seven sections and 204 references valuable. The first covered is mainly that which in Britain Dr. Morrow Brown, of Derby, and his Midlands Asthma and Allergy Research Association have been cultivating.

The term "allergy" seems to have been first used in 1906. Because of its prime concern in the abatement of coal smoke our Society has heard little about "allergens" yet the bad effects of some of these agents have been known and observed for centuries. Students of air pollutions have mostly investigated poisonous, unsocial intrusions emanating from the combustion of fuels, and objectionable inorganic dusts from industry.

Substances that sensitize man are known as "antigens" and as "allergens" when provoking obvious illness. Those involved in asthma and nasal allergy tend to be nitrogenous with molecular weights over 5000. House dust, pollens, fungi, and animal emanations are among the many airborne materials that cause unusual allergy diseases.

*T. Henry Turner*

## **Pollution and the Environment**

### *Research Department of the Labour Party*

This report, prepared by the Research Department of the Labour Party, and presented in May 1970, to the National Conference of Labour Women at Hastings, is the result of a detailed questionnaire and discussion paper sent out in 1969 to labour women's organizations that were to be represented at the Hastings conference.

The introduction of the report admits that any effective attack on pollution is bound to be expensive and that the Labour Party must set itself the task of maintaining and building upon public support for pollution control. "It is therefore part of the aim of this Report to help prepare the Party for a renewed fight on what by now should be very familiar ground: the fight to maintain and enhance the *social* environment and hence our *social* standards of well-being."

Chapter 1 of the report which deals with the pollution of the air, and which therefore is of particular interest to us, emphasizes that in 1968/69 alone, the Government paid out over £3 million on domestic smoke control. The problem of inadequate supplies of solid smokeless fuels will remain according to the Report, and since these fuels compete with other smokeless fuels such as oil, gas and electricity, "to invest in much greater capacity to produce more solid smokeless fuel could therefore be an expensive gamble."



The following suggestions for action in the field of air pollution are summarized:

- the possibility of a small “pollution levy” on household bituminous coal to be studied (to help finance production of smokeless fuel, speed up smoke control programme, finance research, etc.);
- place the smoke control programme on to a firm national base, backed by adequate Government aid, with deadline in mid-seventies for smokeless Britain;
- urgently review Alkali Acts to seek closing of loophole which allows companies to avoid restrictions by pleading “poverty”;
- overhaul procedures and practice of Alkali Inspectorate in enforcing restrictions;
- tighten these restrictions so that each firm uses “best modern standard”, and set deadline for industry to reach these standards;
- investigate possible imposition of “pollution tax” on industry, e.g. where not possible (given existing technology) to clean up discharges;
- give police the power to order *immediate* return to home garage for attention if diesel has bad exhaust fumes, increase financial penalties on offending firms, and introduce a new more stringent British Standard on fuel injection;
- give target date to car companies to remove most of carbon monoxide from car exhausts, and make use of lead-free petrol mandatory.

### **Air Pollution and Health**

*A Report for the Royal College of Physicians, 80 pages. Pitman Medical & Scientific, £1 10s.*

This is a very timely and readable publication which examines very fairly the problems of air pollution and health.

Originally, the Royal College of Physicians of London set up a committee to report on the question of smoking and atmospheric pollution in relation to carcinoma of the lung and other illnesses. The committee decided that, although the effects of air pollution and smoking might be interrelated, the preventive measures required were so different the two hazards should be considered separately. Accordingly, a report of the effects of smoking was published in 1963. The committee has now published its report on “Air Pollution and Health”.

The report considers briefly the history of air pollution for some 700 years and goes on to consider facts about pollution. It points out that it is easy to measure the concentrations of two major pollutants, smoke and sulphur dioxide, but although these may be taken as indices, they are not necessarily the agents that cause ill health. Smoke, grit and dust and sulphur dioxide from domestic and industrial sources are discussed, and the report then briefly considers pollution from road vehicles and makes the point that concentrations of nitrogen dioxide above levels considered safe in industrial practice have not been recorded. Similarly, even in heavy traffic the level of carboxyhaemoglobin (carbon monoxide bound to haemoglobin) found in the blood of those exposed to the fumes of carbon monoxide, rarely reaches that commonly found in cigarette smokers. But, the report continues, there is need for investigation of the possible effects of carbon monoxide from car exhausts on, for example, perception.

The report considers at length the effects of air pollution on bronchitis. Some 30 million working days are lost to industry each year because of bronchitis and the total cost of this amounts to some £65 million a year. The report considers it is, therefore, important to discover the causes of the disease and ways of preventing it. The report concludes that early chronic bronchitis is brought on by cigarette smoking. But, as was illustrated by the smog of London in December 1952, the breathing of polluted air by people suffering from chronic bronchitis can have deadly effects. Each of several periods of fog during the winter 1958/59 was associated with an immediate increase of mortality, mainly from bronchitis and pneumonia. Nevertheless, the report emphasises that there are differences between town and country. Among postmen, for example, rates for disabled men, premature death and for absence from work because of bronchitis were high in those working in the most polluted areas. A survey in 1961 showed that bronchitis was twice as frequent in large towns as in rural areas. But again the report comes back to the statement that cigarette smokers are three times more likely to suffer from chronic bronchitis than non smokers.

The report goes on to state that while there is no doubt of the ill effects of air pollution, the relative importance of such pollutants as smoke and sulphur dioxide has not been established. It considers that the significance of different pollutants may be further elucidated when more is known of the effects of the Clean Air Acts.

The report considers that pollution from domestic sources, is the most likely to effect health, and points to the benefits of district heating systems.

The Committee who produced the report consider that the universal and effective implementation of the Clean Air Acts is the most urgent task confronting central and local government in the control of air pollution, and states categorically that all new housing developments should from the outset be designated as smoke control areas.

All in all, this is a most interesting report which contains a fund of very valuable information.

### **Approaching the Benign Environment. The Franklin Lectures in the Sciences and Humanities**

*Edited by Taylor Littleton. University of Alabama Press. 6 dollars.*

This is the first booklet comprising three lectures: "Education for Comprehensivity" by R. Buckminster Fuller, "Engineers and the Nation's Future" by Eric A. Walker and "Towards a Working Partnership of the Sciences and Humanities" by J. R. Killian, Jr.

The book is eminently readable and entertaining. Mr. Buckminster Fuller develops his theme of comprehensivity and states that he finds it surprising that society thinks of specialisation "as logical, necessary, and desirable if not inevitable".

Mr. Walker examines the engineer's place in society and shows how much we owe to him. Whilst agreeing that research is necessary he reminds us that a nation that devotes a great deal of its energies and resources to pure science without an equal return in practical benefits for the citizens who pay the bill, cannot hope to have the support of those citizens.



Mr. Killian cogently makes the point that there is not only room but a need for both science and the humanities and that if mankind is to benefit they must both work together.

### **Solid Smokeless Fuels Federation Annual Report 1969**

This is a comprehensive report of the Federation's activity during 1969 and as the report states this was the busiest year the Federation had yet known. On the other hand it proved to be most difficult for against an increasing demand, there were "areas of local shortages, particularly for the reactive open fire fuels".

The report continues that early in 1969 it became clear that the run down of gas-coke was affecting availability to a greater extent than previously estimated. "It was realised that if gas-coke production continued to run down rapidly and if at the same time more smoke control orders were approved, there could be difficulties in supply in the winter 1969/70, which were likely to become more acute during the winter 1970/71." As a result it became necessary for the Federation to amend its advice to local authorities that an assurance of supplies of solid smokeless fuels for new smoke control areas could only be given providing the order was planned to become operative after 1 April 1971. It is to be hoped that the steps taken by the various members of the Federation to overcome this gap will be successful.

### **The British Steel Corporation—Annual Report and Accounts 1968-69**

This report covers the period from 1 October 1968 to 27 September 1969, the Corporation's second financial year.

It is a very comprehensive report which considers the year's progress in great detail. It reviews operations, marketing, planning, and investment, overseas and diversified activities, personnel and social policy, finance, and external relations. It is interesting to note that during the year under review substantial capital expenditure was authorised for the purpose of improving the environment of iron and steel making localities. "Over £3¼ million was for schemes specifically intended to reduce air and water pollution from existing operations in addition to the considerable expenditure included in general major development schemes to ensure that they fulfilled present day requirements in respect of control of atmospheric pollution and water conservation." This is no small amount of money and it is a pity that the report does not give a few more details of what has actually been carried out in the way of reduction of air pollution. Perhaps in another year we may look for more details which will be of great interest to this Society.

### **Women's Advisory Council on Solid Fuel 26th Annual Report**

This report on the work of Women's Advisory Council on Solid Fuel for 1969 indicates an increase in their activities and a very successful year. Once again there has been a very large increase in the numbers contacted by the organisation and attracted into its meetings. The Council have found that small functions held in hotels, town halls, assembly rooms, village halls and the like in places where they wish to publicise solid fuel, have proved most successful. The report continues that it is indebted to the work of its 14 regional committees which have contributed much to its activities all over the country.

## **The 36th Annual Report of the Electric Vehicle Association of Great Britain Ltd.**

This report indicates that 1969 was a successful year for the Association. The number of electrical vehicles manufactured during the year was increased and some 3,380 new battery electric vehicles were registered for use on the public highway. This is a distinct increase on the number put on the roads in the previous year. This figure includes industrial vehicles licensed as such but it does not include vehicles used in industrial or hospital service on private property. Here, again there was a large increase in such industrial trucks manufactured during the year. The Association made a distinct effort during the year to obtain extra publicity and carried out a vigorous advertising campaign.

## **Shell-Mex and B.P. Group Book of the Year 1969**

This beautifully produced book, for the third consecutive year has been designed and illustrated by a team of students from the School of Graphic Design of the Royal College of Art.

Mr. T. R. Grieve's Comment on the Year states: "During 1969 all divisions of the group have continued successfully to achieve their marketing objectives in the face of steadily increasing competition and against the background of continually rising costs." During 1969 over 40 million tons of petroleum products were sold and the gross turnover exceeded £1,300 million. The book goes on to describe how Shell-Mex and B.P. served their customers and in a specific article on "The Place of Oil in the United Kingdom Economy" states categorically that oil will soon be the largest provider of Britain's energy needs, and will overtake coal within the next few years, but goes on to comment that despite their crucial role in the economy of the country, oil products are the only energy source taxed in Britain.

The report concludes "free enterprise oil enters the 1970s ready to discharge responsibly and efficiently its imminent role as chief supplier of this country's energy".

## **Methods for the Measurement of Air Pollution. Parts 1, 2, 3 and 4.**

*The British Standards Institution. 10s. net each part.*

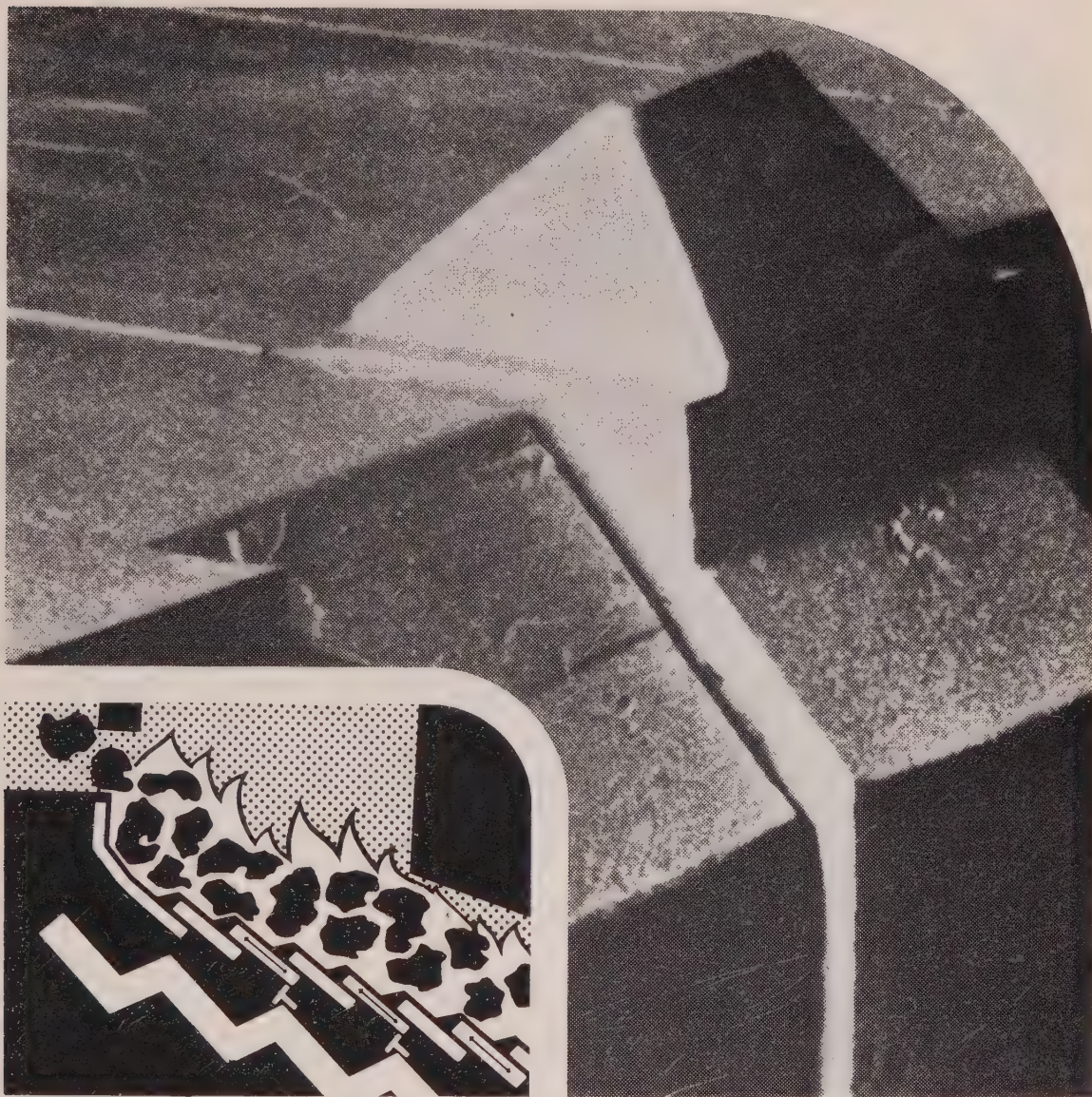
These handbooks, familiar to many, concerned with air pollution, have now been republished. They have all been brought up to date and employ the new metric units.

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The Combustion Engineering Association announce that the full report on their conference on "Legislation and the Fuel User" which was held at Brighton on 29/30 October 1969, and on which we reported briefly in our Winter 1969, issue is now ready. The conference provided an opportunity to discuss the present position on various aspects of legislation and confirmed the need for immediate and effective training of boiler operators. The report comprises a complete text of the papers presented together with a full report of the discussions which ensued. Copies are available at the charge of 42s. each from the Director, The Combustion Engineering Association, Trident House, Station Road, Hayes, Middlesex.



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# INTERNATIONAL NEWS

## NEW ZEALAND

### **1968 Report of the Chief Chemical Inspector**

Reviewing legislation in his country, the Chief Chemical Inspector of New Zealand states in his tenth annual report that the Smoke Regulations—which duplicate the industrial provisions of the British Clean Air Act for non-scheduled industry—will not become fully operative in any area until 1971. The period since 1964—when these regulations were made available to local authorities—was one of consolidation both for training of personnel and for industry. With the exception of petroleum refining, no major new direction in industry had appeared, but the established industries had all expanded enormously and had become much more technically competent. The situation in New Zealand was on the point of becoming much more complex and so the moment was appropriate to review their air pollution legislation and, if possible, to correct any deficiencies.

The Report refers to the empiric approach in Great Britain, concentrating on the obvious sources of pollution. This approach was successful but not only because of enlightened legislation. It was good luck that the British Clean Air Act happened to coincide with technological improvements in the use of industrial fuel and with other factors. In New Zealand similar social forces were at work "though possibly not fast enough to satisfy the now much more awakened public concern about air pollution". The Report mentions two societies actively concerned with pollution prevention: the Clean Air Society of New Zealand, which is affiliated to the National Society for Clean Air, and the rather more technical Clean Air Society of Australia and New Zealand.

### **Air Pollution Committee**

As the time was opportune, the Minister of Health had requested the re-appointment of the Air Pollution Committee and it was re-established on 6 November 1968 with terms of reference "to consider the adequacy of existing air pollution legislation and to make recommendations to the Board of Health and the Minister of Health".

### **Air Pollution Surveys**

The air monitoring used, indicates a slow but significant increase in pollution in Auckland and a decline in Christchurch where pollution was falling in central areas but also rising with increasing housing density in the suburbs. From an estimate prepared for the Auckland area for 1966, it appeared that of total pollutants discharged into the atmosphere more than 80 per cent was from motor vehicles, 5.3 per cent from consumption of coal, 6.9 per cent from fuel oil and 3 per cent from the scheduled

processes. Although quite high concentrations of carbon monoxide have been found, these concentrations fall off quite rapidly away from the roads and the levels measured did not yet constitute a health hazard "though undoubtedly somewhat offensive".

The Report states that there is a need for a well developed information service on air pollution to be available to local and regional planning authorities. In conclusion the work of the chemical inspectorate is described in detail with regard to the non-scheduled and scheduled industries.

## U.S.A.

Increasingly stringent Federal motor vehicle emission standards were announced in February by the Secretary for Health, Education and Welfare, Robert H. Finch. Beginning with the 1975 model year, proposed new standards will sharply lower limits on exhaust emissions of carbon monoxide and hydrocarbons that went into effect on 1970 model vehicles. Also the new standards will for the first time set limits on exhaust emissions of nitrogen oxides—to begin with the 1973 model year—and will for the first time set limits on exhaust emissions of particulates—beginning with the 1975 model year.

The proposed 1973 nitrogen oxides standards will limit exhaust emissions to 3.0 grams per vehicle mile, as compared to emissions of approximately 6 grams from an uncontrolled vehicle. The nitrogen oxides limit would be lowered to 0.9 gram effective with the 1975 model year. Particulate emissions would be limited beginning with 1975 model vehicles to 0.1 gram per vehicle mile, as compared to emissions of approximately 0.3 gram from an uncontrolled vehicle. The current limit of 2.2 grams per vehicle mile for hydrocarbons would be lowered beginning with 1975 cars to 0.5 gram, and the current monoxide limit of 23 grams would be reduced to 11 grams.

## JAPAN

### Change in Fuel Policy

Plagued for years by an increasingly high  $\text{SO}_2$  content in the air, the Japanese Government has had drawn up a series of draft regulations. The main immediate effect of these will be a shift in crude oil supply, with the emphasis going towards low-sulphur crudes. A draft report issued at the beginning of the year by the Desulphurization sub-committee of the Overall Energy Investigation Council, calls for a reduction of  $\text{SO}_2$  content in the air to 0.2 ppm for 99 per cent of the total hours in the year, with 0.1 per cent aimed at for 88 per cent of the total hours. It is hoped that this can be achieved by 1978.

The imports during 1969 in Japan of low-sulphur crude oil were 10 per cent of the total and will be increased in 1972 to 22 per cent. By that time the Japanese hope to increase the amount of crude oil burned in power stations by 300 per cent which again should lead to a reduction of  $\text{SO}_2$  pollution. LNG imports will also be expanded and as an incentive towards the purchase of low-sulphur crude, the import tax on it will be halved, while companies installing desulphurization units will pay no import tax at all. The latter will also benefit from low interest loans for plant installation and other fiscal measures.



U.S.S.R.

According to an item published in the *Birmingham Evening Mail* (25 February), the Russians claim invention of low-pollution lorry engine that they say is far simpler than foreign ideas. Tass, the Soviet news agency, said that "for practical purposes, it will not pollute the air with discharge gas". The agency said it is an ordinary 30 h.p. internal combustion petrol motor fitted with chambers attached to each of the cylinders to ensure the complete burning of petrol. A small quantity of fuel comes in and, when ignited, burns the lean mixture in the cylinders". It said that engines ordinarily could not operate on so lean a mixture. According to Tass, the Soviet engine has been tested and recommended for regular production. It gave no indication when production might begin.

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### **European Conservation Year 1970**

The following statement has been issued by the Council of Europe following the meeting of the Committee of Ministers on 15 April:

The Committee of Ministers expressed unanimously their great satisfaction with the results obtained by the first European Conservation Conference convened in Strasbourg from 9-12 February last by the Council of Europe.

In order particularly to avoid the proliferation and dispersion of efforts the Committee of Ministers underlined the necessity to reach a rational and efficient division of tasks and work between the various international organisations interested in environmental questions.

The Committee called on the Ministers' Deputies to study and to prepare a Ministerial conference on the Environment.

This gives the green light to one of the most important proposals in the Strasbourg declaration, and it is hoped that the Ministerial Conference can meet within the next twelve months.

Other objectives of the Ministerial Conference proposed in the declaration are the setting up, through the international organisations concerned, of internationally agreed standards for European industry; the harmonisation of national legislation relating to the environment; examination of the proposal to create a European Authority to guide and supervise the management of the natural environment of Europe; and examination of the possibility of creating a European fund for combating pollution.

# News from the Divisions

## Yorkshire

### **Retirement of Mr. James Goodfellow**

Mr. James Goodfellow who acted as Honorary Secretary to the Yorkshire Division of the National Society for Clean Air for the past 24 years, retired on 25 March immediately after the close of the Division's Annual General Meeting.

In 1946 as nominated acting Honorary Secretary, he convened and advised the meetings that drafted the Rules and Constitution for the Yorkshire Divisional Council which were approved and adopted by the first meeting of the Yorkshire Members of the National Smoke Abatement Society held in the Civic Hall, Leeds, on 18 September 1947.

Mr. Goodfellow has represented the Yorkshire Division on the National Executive Council for the whole of this period, and was Chairman of the Executive Council of the Society for the years from 1964 to 1967.

That the Yorkshire Division has been one of the most successful was due largely to Mr. Goodfellow's refusal to be side tracked into the partisan issues of individual fuels, and his constant adherence to the broad aim to create and promote by publicity an informed public opinion on the value and importance of clean air.

At the Division's A.G.M. held at Leeds, Mr. J. W. Batey of Sheffield, the present Chairman of the Division, on making a presentation to Mr. Goodfellow, paid tribute to Mr. Goodfellow's efficiency—he prepared and saw approval for 81 smoke control orders covering some 60,000 houses in Leeds—to his kindness and to his fairness.

Mr. Goodfellow has left the industrial West Riding and gone to live in Norfolk. All members of the Society wish him and Mrs. Goodfellow a very happy and worthwhile retirement.

*J. H. Wyatt, Hon. Secretary.*

## North East

On 23 April last the North East Division held its annual general meeting at Norgas House, Killingworth, Northumberland. This was one of the most successful meetings of recent years and a total of 90 members signed the attendance register. The occasion began by delegates assembling in the foyer of Norgas House where they enjoyed coffee while inspecting an excellent clean air exhibition and display of gas burning appliances which had been organised by the Board. After these refreshments the business meeting was commenced.

The Chairman, Alderman B. N. Young, O.B.E., during the course of his



address, which had been printed and circulated, referred to the existing Gluco crisis in the North East and hoped that opinions would be expressed freely and frankly when this matter was discussed later during the meeting. He continued by giving a brief account of his activities on the Executive Council during the year and mentioned that Professor P. C. G. Isaac of Newcastle University would no longer be available for nomination as a representative of the Division. The Chairman commented on the search for new accommodation for headquarters' staff and informed representatives that suitable accommodation had been found in Brighton, although he wished to make it quite clear that he felt that insufficient consideration had been given to the acquisition of premises North of London either in the Midlands, North West or the North East. He concluded his brief remarks by expressing dismay over the calamity which had forced many local authorities to suspend smoke control orders but expressed the hope that the position at the next annual meeting would be much more encouraging.

The election of officers resulted in the re-election of the Chairman, Alderman B. N. Young, O.B.E., the Vice-Chairman, Councillor T. P. S. Prudham of Felling U.D.C., and Professor P. C. G. Isaac of the University of Newcastle upon Tyne and the Honorary Secretary and Treasurer, Mr. L. Mair. Because Mr. F. Ireland, the Honorary Auditor, had recently been appointed Principal City Officer to the City and County of Newcastle upon Tyne, he was unable to continue in his post as auditor and it was agreed unanimously that Mr. C. J. Davies, who succeeded Mr. Ireland as City Treasurer in Newcastle, be elected as Honorary Auditor for the ensuing year.

The election of officers was followed by a discussion on the problems relating to the solid smokeless fuel supplies in the North East. This contentious matter was introduced by Mr. R. Emerson, Chief Public Health Inspector of Hartlepool County Borough, during the course of which he referred to the irony of a situation where, during European Conservation Year, local authorities were asking, as a matter of urgency, for the relaxation of smoke control orders and this despite the assurances in the past that there would be ample fuel supplies available to meet all requirements. It was clear, he said, that local authorities had been badly let down and no useful purpose would be served by all the parties involved blaming each other for the present unhappy situation and no useful help appears to be available from the various Government departments. Mr. Emerson then briefly outlined points of action which he thought could usefully be pursued and finally moved—

“That this Annual General Meeting, taking note of difficulties that have occurred over the supply of solid smokeless fuel during the winter 1969/70, most strongly urges the Society to take all possible action at national level to ensure an improvement in the position before next winter, and in particular to press H.M. Government and the Northern Gas Board to continue the supply of Gluco until such time as adequate alternative solid smokeless fuels are available at a comparative price.”

A prolonged and vigorous discussion ensued in which Messrs Robson of the Coal Merchants' Federation, Smith of the Newcastle Regional Hospital Board and the Honorary Secretary took part. The motion was duly seconded and carried unanimously.

The Honorary Secretary then referred to a communication he had received from the Director asking for the views of the North East Division on the proposal to establish a pulp mill at Low Prudhoe in the Tyne Valley. He outlined the background to these proposals and expressed the concern felt by many residents in the Tyne Valley and, in particular, referred to the anxiety expressed in a letter received from the Chairman of the Tyne Valley Action Group. The Honorary Secretary expressed his strongly held view that this pulp mill would, if established, be prejudicial to the environment of the neighbourhood, would be a source of river pollution and, in particular, would present an intractable problem so far as air pollution was concerned if experience of other pulp mills could be taken as a guide.

The Chairman followed by commenting briefly on what the Honorary Secretary had said and during the course of the discussion it was clear that the Honorary Secretary's views were not shared by the rest of the meeting. After discussion it was moved by Councillor J. R. Sudder and seconded by the Vice-Chairman, Councillor T. P. S. Prudham, that headquarters be informed that the North East Division do not oppose the establishment of a pulp mill at Low Prudhoe but urge that every precaution be taken to minimise air pollution arising therefrom.

### **Symposium on North Sea Gas Supplies**

Mr. A. S. Middleton, Director of Marketing and Supplies of the Northern Gas Board, then introduced the speakers who were to give addresses on the use of North Sea gas. The first such speaker was Mr. J. B. Allan, Domestic Sales Manager of the Board who dealt with "The application of North Sea gas in the domestic field and its relevance to Clean Air". After briefly referring to health hazards and the incidence of bronchitis in the North East region Mr. Allan described the emergence of North Sea gas as a domestic fuel and by means of slides showing graphs and charts demonstrated the domestic applications and running costs. The slides included colour illustrations of the latest domestic equipment and appliances and special mention was made of package deals for the average sized dwellinghouse. This speaker was followed by Mr. J. Allan, Industrial Sales Manager, who dealt with "The industrial and commercial application of North Sea gas and its relevance to Clean Air" and by means of slides indicated the pollution-free nature of North Sea gas as compared with other fuels. He concluded by giving an account in some detail of industrial applications.

The third speaker was Mr. R. Cairncross, Press and Publicity Officer, Conversion, who dealt with "Problems associated with the conversion of gas burning appliances to Natural Gas". Mr. Cairncross gave an outline of the programme of conversion in the North East and explained why conversion was necessary and how the financial implications were to be cushioned by the Board itself. The morning's business concluded by a brief statement from Mr. Roy Gazzard, Director of Development, Killingworth Township, who gave a brief historical account of the establishment of Killingworth, the problems which faced the developers and gave a background to the coach tours which had been arranged for later in the afternoon.





Delegates in the North East board the Helicopter

At the conclusion of the symposium members embarked on coaches and proceeded to the Banqueting Rooms, Gosforth Park, where they enjoyed pre-lunch cocktails and were entertained to lunch at the kind invitation of the Northern Gas Board. At the conclusion of the lunch the Chairman of the Northern Gas Board, Mr. L. J. Clark, addressed delegates and expressed a warm welcome on behalf of the Board. During the course of his talk he referred to the interest in clean air which his organisation shared with the Society and assured the assembly of the continuing support of the gas industry in the campaign against air pollution. The Chairman, Alderman B. N. Young, suitably replied and called upon Mr. R. V. Robinson, Chief Public Health Inspector of South Shields, to propose a vote of thanks to the Northern Gas Board, the panel of speakers and to the staff of the Board for the excellent arrangements which had been made for the holding of the meeting. This vote of thanks was carried with acclamation and members returned to Norgas House, Killingworth, by coach.

### **Aerial Survey of Air Pollution**

Arrangements had been made by the Northern Gas Board for the activities of the afternoon to include a series of trips in a 24 seater Sikorsky helicopter for the purpose of making an aerial survey of the air pollution of the region. Each trip lasted approximately 30 minutes and the weather, although gusty, provided excellent visibility. On leaving Norgas House the helicopter proceeded eastwards to the coast then south to the estuary and harbour of the River Tyne and westwards along the south bank over Gateshead and the west of Newcastle and therefrom returned direct to Killingworth and most representatives appear to have been surprised at the moderate extent of the pollution as seen from the air. To the north and west the Cheviots and the Pennines were clearly visible and it was only by comparison of these views with the Tyneside aspect that pollution was apparent.

During the helicopter trips the delegates remaining on the ground were being entertained to tea and being shown a film dealing with natural gas supplies in the Board's cinema. The return of the helicopter on its final trip concluded a most useful, interesting and very enjoyable day for which the Division was indebted to the management and staff of the Northern Gas Board.

*L. Mair, Hon. Secretary.*

## Air Pollution Abstracts

**1173. An Exploratory Study of Automobile Driving Performance Under the Influence of Low Levels of Carboxyhemoglobin.** Ray, A. M. and Rockwell, T. H. (The Ohio State University, Columbus, Ohio). The research that is reported here was designed to investigate and quantify the effects of low levels of carboxyhemoglobin (percent of hemoglobin combined with carbon monoxide) on human performance, particularly in regard to the automobile driving task. Subjects were tested under actual highway conditions at levels of 0 per cent, 10 per cent and 20 per cent carboxyhemoglobin. Significant differences in the performance measures that were studied were noticed as carboxyhemoglobin levels increased, particularly in response to relative velocity changes and brightness discrimination.

**1174. Smoking, Air Pollution and Bronchitis in Britain.** Lambert, P. M. and Reid, D. D. (The Lancet, 25 April 1970, pp. 853-857). A postal survey of the prevalence of respiratory symptoms has been carried out in a large sample of the British population. Analysis of the 9,975 replies from men and women aged between 35 and 69 (74 per cent of those presumed able to reply) showed satisfactory agreement with Census and other data. Increasing prevalence with ageing and cigarette consumption has been confirmed. A male excess is seen among non-smokers as well as smokers. Urban/rural gradients are not explained by smoking differences alone. Prevalence-rates for symptoms rise with increasing levels of air pollution independently of cigarette consumption.

Without cigarette smoking, local pollution seems to have little effect. In smokers, however, high levels of pollution are associated with more frequent respiratory symptoms. The frequency of more serious bronchitis increases most steeply with age among smokers in the more polluted districts.

**1175. LNG—Key to an International Natural Gas Industry?** Joyce, T. J. (American Gas Journal, June 1969, 196, pp. 28-32). The advantage of 1-to-7 delivered cost ratio (gas energy system over electric system) can lead to gas domination of the energy market if novel, imaginative, and superior developments are made. Fuel cell could compete for total single energy market of 5 to 9 million dwelling units by 1980 if cell cost is low. Automatic, compact catalytic reformers will convert natural gas to hydrogen for use in fuel cell, candoluminescent lights, combination light and heat devices (with porous thoriaceria disc), and absorption refrigeration and air conditioning (with humidity and comfort control surpassing electric units). Air pollution control has added another aspect to the future of gas, especially of hydrogen and sulphur-free natural gas (electric utilities contribute about 48 per cent of sulphur oxide air pollution each year according to U.S. Public Health Service). LNG can be used in trucks, buses, cars, and jet engines for further pollution control. Natural gas offers an exciting potential for synthetic food production and production of hydrogen for fertilisers, methyl alcohol, hydrogenation and hydrocracking of petroleum products, and other applications. Potential for



gas is high but dependent on supply which can be met by increased exploration, gasification and imports. (The J. of Fuel & Heat Techn. Feb. 1970.)

**1176. Atmospheric lead: Its relationship to traffic volume and proximity to highways.** Daines, R. H., Motto, H. and Chilko, D. M. (Env. Science & Techn., April 1970, 4 No. 4, 318-322). Automobile traffic definitely contributes to lead in the atmosphere. At locations near the highway, the effect of traffic density on the lead content of the air is at a maximum, but at distances greater than 250 feet, the effect of the traffic density is largely lost. More than 65 per cent of the lead in the air from 30-1,750 feet from a well travelled highway (48,000 cars daily) consists of particles under  $2\mu$  in diameter, and more than 85 per cent consists of particles under  $4\mu$  in diameter.

**1177. The Effect of Air Pollution on Vegetation.** Wojcicka, I. (In Polish) ("Ochrona Powietrza" 1970, 4, No. 1 (15) 1-3). The article discusses deleterious effects of air pollution on vegetation, the economic and social losses caused through pollution, preventative measures against destruction of vegetation and direction of further research.

**1178. A Contribution towards the Reduction of Ice Fog caused by humid stack gases at Alaskan Power Stations.** Porteous, A. and Wallis, G. B. (Atmospheric Environment, 1970 4, 21-33). The humid power station gases at U.S. Army and Air Force Bases in Alaska can cause considerable ice fog visibility problems. This phenomenon occurs when the ambient temperature is such that water vapour in the gases nucleates and freezes on grit particles to form minute ice crystals that have no appreciable settling velocity, thus forming a dense blanket of ice fog in the temperature range  $-20$  to  $-40^{\circ}\text{C}$ . Various alternatives are considered for drying the stack gases and counter current droplet scrubbing is chosen as the most promising method. Theoretical moisture removal predictions are made and confirmed experimentally. A spray tower is then designed for the conditions at a typical air base, with consideration given for optimum droplet size to accomplish both grit and moisture removal from the gases.

**1179. The Incineration of Municipal and Industrial Wastes Conference, Brighton, 25-26 November 1969. Paper 1. Posing the Problem.** Brown, B. R. (J. Inst. Fuel, March 1970, 43, 85-91). The problem of domestic and industrial wastes is discussed. The amount and composition of the former are examined in detail, as also are some of the data on which the prediction of future trends might be based. Various methods of disposal are considered, and particular attention is given to the large-scale incineration of domestic wastes. A number of the difficulties likely to be encountered in this connection are mentioned. An attempt at the assessment and classification of industrial wastes is made, and some methods of disposal are examined, with particular emphasis on those employing combustion processes. It is concluded that the disposal of domestic and industrial wastes is an urgent social problem which is likely to get worse. At present there is a relative dearth of data on which to base accurate forecasts of trends. A research programme into the nature and disposal of wastes in the United Kingdom is advocated.

**1180. Measurements of domestic smoke emission and their application to clean air legislation.** Dickinson, R. (J. Inst. Fuel, March 1970, 43, 75-81). To assist the implementation of clean air policy, a laboratory investigation has been carried out to determine the weight of smoke emitted from domestic solid fuels and appliances, using a small electro-precipitator. A representative range of open-fire fuels (covering bituminous coals, low-volatile steam coals, anthracite, manufactured fuels and wood and peat fuels) was compared by a standard series of tests, and supplementary investigations were made to find the effect of such factors as method of ignition, size grading and refuelling procedure. Measurements were also made of the emission from two authorized fuels on a small boiler and from a limited number of experimental smoke-reducing appliances. It is shown how the results enabled the British Standards Institution to draw up a Standard for the authorization of manufactured smokeless open-fire fuels (B.S. 3841:1965) and to recommend criteria for the exemption of smoke-reducing appliances (B.S. P.D. 6434:1969) submitted for use in smoke control areas.

**1181. The Incineration of Municipal and Industrial Wastes Conference, Brighton, 25-26 November 1969. Paper 2. Incineration: Statutory requirements and environmental aspects.** Ireland, F. E. and Price, D. H. A. (J. Inst. Fuel, April 1970, **43**, 115-119). The Paper is divided into two parts dealing with (1) air pollution, and (2) water pollution.

1. The relevant Acts are (1) Public Health Act 1936, which deals with nuisance; (2) the Clean Air Acts 1956 and 1968, dealing with products of combustion and chimney heights, and (3) the Alkali etc. Works Regulation Act, 1960, dealing with certain difficult chemical wastes. The subject of chimney height assessment is given special treatment because of its importance in determining the impact of the airborne emissions on the environment.

**1182. Gaseous Sulphur Pollutants from Urban and Natural Sources.** Robinson, E. and Robbins, R. C. (Journ. Air Poll. Contr. Assoc., April 1970, **20**, No. 4, 233-235). Major aspects of the circulation, through the atmospheric environment of sulphur pollutants have been estimated, including source magnitudes, residual atmospheric concentrations and scavenging processes. The compounds considered include  $\text{SO}_2$  and  $\text{H}_2\text{S}$  as well as sulfates. One-third of the sulphur reaching the atmosphere comes from pollutant sources, mainly as  $\text{SO}_2$ . Within the atmosphere there is a net transfer of sulphur from land to ocean areas. Pollutant sources annually amount to  $73 \times 10^6$  tons of sulphur while natural sources amount to  $142 \times 10^6$  tons, mainly as  $\text{H}_2\text{S}$  and sulfate sea spray. More than two thirds of the natural and pollutant sulphur emissions occur in the northern hemisphere. When only pollutant emissions are considered, 93 per cent occur in the northern hemisphere.

**1183. Demonstration of the Effects of Sulphur Dioxide on Vegetation.** (In German), Guderian, R. and van Haut, H. ("Staub", January 1970, **30** No. 1, 17-26). A basis for the diagnosis of sulphur dioxide effects on plants is given by the results of open air tests and of experiments in conditioned air chambers and also by the results of official inquiries carried out in emission zones. The different methods, such as symptomatologic investigation,

chemical, biochemical and physiological plant analyses, air analysis and also exposure methods using indicator plants, are described and their significance for  $\text{SO}_2$  detection is assessed.

**1184. Man and Environment.** Boote, R. E. (First International District Heating Convention, London, 20-24 April 1970, District Heating Association, Derbyshire House, St. Chad's Street, London, W.C.1). The paper discusses the following themes: the significance of environment to Man and his impact upon it; the forces at work—population numbers, material expectations and technological powers and some of their impacts on the environment; the choices open to man and the attitudes required; conservation defined in relation to economical, ecological and ethical factors; planning—the principles, concepts and techniques; participation and education with special reference to European Conservation Year 1970. The author then deals with the four main themes of the European Conservation Conference and their significance to industrialists and developers with special reference to the opportunities arising from modern technology such as district heating. In conclusion he looks at the way ahead in terms of basic principles set out in the European Conservation Declaration and the particular relevance to district heating.

**1185. Peak Load Operation of District Heat and Power Stations.** Halzl et al. (First International District Heating Convention, London, 20-24 April 1970, District Heating Association, Derbyshire House, St. Chad's Street, London, W.C.1). Back pressure power generation from a district heat and power station has a limited value for the power system because it varies with outdoor temperatures, resulting in a low utilization of power plant capacity. The heat storage capacity of the hot water distribution system and of the heated buildings makes it possible to run district heating power stations in peak-load operation, thereby increasing their peak-time available electrical output. The paper summarizes the results of peaking experiments carried out recently in several district heat and power stations in Hungary. The experiments demonstrated convincingly that peak-load operation is acceptable for the heat



consumers and possible in summer if the power station supplies domestic hot water as well. Peak-load operation is also possible in a nuclear district heating power station. The paper discusses the operational conditions resulting from peaking and estimates the

economy of such an operational mode. Nuclear district heating enables part of the communal energy requirements to be met by nuclear energy while increasing its contribution to power output in an economically satisfactory way.

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## Clean Air Conference—Eastbourne, October 1969

### Part 2. Reports and Discussions

#### ERRATA

On page 35 of the report please substitute the following for the last two paragraphs: "Mr. Ross had put forward an interesting approach to the problem of costing the damage attributable to sulphur dioxide emissions. Mr. Fuller would need to look again at the fuel oil desulphurization costs quoted in the paper; he did not think they were wrong, but did not see much prospect of getting the cost of removing 1 ton of sulphur down from £100 to the figure of £10 mentioned by Mr. Ross.

In reply to a remark made by Mr. A. C. Saword, in which he claimed that Mr. Fuller was wrong to take the attitude that the public ultimately pays, Mr. Fuller said that he could not agree as any extra processing that had to be applied to a fuel was bound to increase its costs and ultimately the costs had to come back to the community as a whole. It was rather as if . . ."

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## New British Petroleum Film

Beautifully photographed in colour, "The Shadow of Progress" is a new film made by BP as part of its contribution to European Conservation Year. The film examines internationally our technological affluent age and asks basic questions about what we are doing and where we are going. It discusses man, his environment, the present state of the world's resources and conservation. There are some very striking shots from cities in Europe, America and Asia; of crowds, multitudinous cars, chimneys belching smoke and other illustrations of the way in which mankind is slowly rendering unusable the finite resources of his world. But the film is not without hope and it discusses remedies and shows what improvements can be made—in the case of air pollution, the resurrected Pittsburgh, and Paris, where the furnaces of four factories, transform a city's garbage into electric power and steam for central heating.

The Film concludes that technology alone cannot banish the shadow of progress. We can have a cleaner world, if we are willing to pay for it.

Running time: 26½ minutes. Produced by Humphrey Swingler, written and directed by Derek Williams.

# SMOKE CONTROL AREAS

## Progress Report

Position at 31 March 1970

(Figures for England supplied by Ministry of Housing and Local Government)

	England	Wales	Scotland	Northern Ireland
<b>Smokeless Zones (Local Acts) in Operation ...</b>	44	—	—	—
Acres, 3,400				
Premises, 41,060				
<b>Smoke Control Areas in Operation...</b>	2,990	6	140	18
Acres ... ..	777,436	418	74,630	6,992
Premises ... ..	4,046,540	2,352	351,665	8,438
<b>Smoke Control Areas Confirmed ... ..</b>	200	1	9	10
Submitted ... ..	94	1	4	1
<b>Grand Totals ...</b>	3,328	8	153	29

### Smoke Control Position in Regions of England at 31 March, 1970

(Figures supplied by Ministry of Housing and Local Government).

(1)  Region	(2) No. of black area acres covered by smoke control orders con- firmed or awaiting decision	(3) Percentage* of total black area acreage in region covered	(4) No. of black area premises covered by smoke control orders confirmed or awaiting decision	(5) Percentage* of total black area premises in the region
Northern ... ..	37,229	29.7	153,246	27.7
Yorkshire and Humberside ... ..	178,468	47.4	590,477	50.6
East Midlands ... ..	59,985	22.4	183,407	35.8
Greater London ... ..	236,140	72.2	2,079,518	78.8
North Western ... ..	187,523	46.7	772,478	45.4
West Midlands ... ..	82,076	33.0	370,936	35.3
South Western ... ..	7,505	28.5	28,697	19.3
Total (black areas) ...	788,926	44.5	4,178,757	53.7
Outside black areas (all parts) ...	141,364		454,698	
<b>Grand Totals ...</b>	930,291		4,633,457	

\* The percentage shown in columns (3) and (5) above are percentages of the total acreage and not the total number of premises in the black areas concerned. In practice it may not always be necessary for the whole of the black area authority's district to be covered by smoke control orders (e.g., there may be some areas of open country).



# New Smoke Control Orders

The lists below are supplementary to the information in the last issue of "Smokeless Air" (Spring 1970) which gave the position up to 31 December, 1969. They now show changes and additions up to 31 March, 1970.

Some of the areas listed are new housing estates, or areas to be developed for housing. The total number of premises involved will therefore increase. An asterisk denotes that there have been objections and that a formal inquiry has been or will be held.

The list of new areas in operation of smoke control is based on the plans submitted to the Ministry of Housing, but may erroneously include some local authorities who have made postponements, without notifying the Ministry of the fact.

## ENGLAND NEW SMOKE CONTROL ORDERS IN OPERATION

### Midlands

Derby, Nottingham and Chesterfield  
Alfreton U.D. No. 4.

### Local Authorities outside the Black Areas

Cheltenham B. No. 6.

## NEW SMOKE CONTROL ORDERS CONFIRMED BUT NOT YET IN OPERATION

### Northern

#### Tyneside and Wearside

Newcastle upon Tyne C.B. No. 13.  
Wallsend B. No. 5. Whickham U.D.  
No. 9.

#### Teesside

Teesside C.B. Glebe Estate, Norton.

#### Yorkshire

##### West Riding (North)

Aireborough U.D. No. 27. Brighouse  
B. No. 15 and 16. Leeds C.B. No. 78.  
Mirfield U.D. No. 11. Pudsey B.  
Tyersal. Shipley U.D. No. 10 and 11.

##### West Riding (South)

Barnsley C.B. No. 14/1969. Rother-  
ham C.B. Broom Valley No. 1.

#### North Western

##### South Lancashire & North East

#### Cheshire

Ashton-under-Lyne B. No. 10.  
Atherton U.D. No. 6. Eccles B. No.  
12. Hyde B. No. 7.

Manchester C.B. Birchfields. Middle-  
ton B. (Langley No. 10 and Heywood  
Old Road No. 17.). Stockport C.B.  
Offerton.

### Central Lancashire

Brierfield U.D. No. 5. Oswaldtwistle  
U.D. No. 1 and No. 2.

### Merseyside

Bebington B. No. 18 and No. 20.  
Stage 4.

### London

#### Greater London Boroughs

Ealing L.B. No. 48. Harrow L.B.  
No. 21. Kingston upon Thames L.B.  
No. 16 and 17. Richmond upon Thames  
L.B. (Twickenham No. 9). Waltham  
Forest L.B. No. 16. Westminster L.B.  
Wild Street.

### Local Authorities outside the Black Area

Glossop B. No. 4. Hale U.D. No. 3.  
Lincoln C.B. No. 3. Northampton C.B.  
No. 1 and No. 2. Rochester B. No. 5.  
Saltburn and Marske by the Sea No. 1.  
1969. \*Southampton C.B. No. 9.  
Stanley (Durham) U.D. Dipton No. 1.  
Swadlincote U.D. No. 2.

## NEW SMOKE CONTROL ORDERS SUBMITTED BUT NOT YET CONFIRMED

### Northern

#### Tyneside and Wearside

Hebburn U.D. No. 12. Sunderland  
C.B. No. 7 and No. 8. Tynemouth  
C.B. No. 11.

#### Teesside

Teesside C.B. No. 5.

### Yorkshire

#### West Riding (North)

Elland U.D. (Eastward 1969 and  
Northward 1969). Leeds C.B. Nos.  
81-84. Spennorth B. No. 11.

#### West Riding (South)

Sheffield C.B. No. 25.

### North Western

#### South Lancashire and North East Cheshire

Audenshaw U.D. No. 5. Failsworth  
U.D. No. 9. Heywood B. No. 10.  
Leigh B. No. 11. Prestwick B. No. 10  
and No. 11a. Royton U.D. No. 6.

### Central Lancashire

Great Harwood U.D. No. 2.  
Paliham U.D. No. 10 and No. 11.

### Merseyside

Huyton-with-Roby U.D. No. 7.  
Runcorn U.D. No. 6. Warrington R.D.  
No. 4.

### Midlands

#### Derby, Nottingham and Chesterfield

Alfreton U.D. No. 5 and No. 6.  
Arnold U.D. No. 4. Carlton U.D. No.  
6. Derby C.B. No. 19.

### *West Midlands*

Birmingham C.B. No. 148. Sutton Coldfield B. No. 18. West Bromwich C.B. No. 18 and No. 19.

### **London**

#### *Greater London Boroughs*

Bromley L.B. Nos. 10-12. Croydon L.B. No. 12. Ealing L.B. No. 51. Hillingdon L.B. No. 8. Merton L.B. No. 16. Newham L.B. No. 7. Redbridge L.B. No. 16. Southwark L.B. No. 26. Sutton L.B. No. 21 and No. 22.

#### **Local Authorities outside the Black Areas**

Blaby R.D. No. 6. Blackwell R.D. No. 1. Leamington Spa B. No. 9. Reading C.B. No. 14.

### **SCOTLAND**

#### **NEW SMOKE CONTROL ORDERS IN OPERATION**

Bishopbriggs No. 2. (Cleddens)

#### **NEW SMOKE CONTROL ORDERS CONFIRMED BUT NOT YET IN OPERATION**

Bearsden No. 2. Edinburgh (Murrayfield Cremond Nos. 2 and 3). Galashiels (Galapark/Wilderhaugh).

### **NORTHERN IRELAND**

#### **NEW SMOKE CONTROL ORDER IN OPERATION**

Portadown B.

#### **NEW SMOKE CONTROL ORDERS CONFIRMED BUT NOT YET IN OPERATION**

Londonderry Dev. Comm. Nos. 1 and 2. Newtownards B.

#### **NEW SMOKE CONTROL ORDER SUBMITTED BUT NOT YET CONFIRMED**

Belfast C.B.C. No. 3.

### **WALES**

#### **NEW SMOKE CONTROL ORDER SUBMITTED BUT NOT YET CONFIRMED**

Wrexham B.C. No. 4.

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### **ORDERS SUSPENDED**

Since the last issue of "Smokeless Air", the following additional local authorities have been granted by the Ministry of Housing and Local Government orders to suspend the operation of their existing smoke control orders.

The effect of these Suspension Orders is from May 1970 until 30 April, 1971.

Newcastle-upon-Tyne C.B. (Orders 1 to 8). Felling U.D. (No. 1). Sunderland C.B. (any orders in operation). Hebburn U.D. (Nos. 1 and 2). Wallsend B. (Nos. 1 and 2). Stanley No. 1.

Worsley U.D.C., Eccles B.C., Denton B.C., Hyde B.C., Meborough U.D.C., Wombwell U.D.C., Knottingley U.D.C., Darwen B.C.



# ANNUAL CONFERENCE PROGRAMME

## Tuesday, 20th October

10.30—Opening Session

The Conference will be opened by the Right Honourable the Earl of Bessborough.

Presentation of "Arnold Marsh" Clean Air Awards. The President, Sir Kenneth Hutchison, C.B.E., F.R.S., will deliver the Presidential Address.

Presentation of Prizes to winners of North West Clean Air Competition for Children.

"The Clean Air Act 1968".

(a) General Experience of the Working of the Act—F. G. Sugden (Chief Public Health Inspector, Teesside).

(b) The Measurement of Grit and Dust—W. Short (National Industrial Fuel Efficiency Service).

14.30—Session Two

## Wednesday, 21st October

10.00—Session Three

"The Disposal of Wastes by Incineration"—E. Higginson (Assistant Director, Public Health Engineering, Greater London Council).

"Conservation".

(a) European Conservation Year 1970—R. E. Boote (Secretary, European Conservation Year 1970).

(b) Conservation in the North West—Stanley Jeeves (Secretary (NW) Council for Protection of Rural England).

(c) The Contribution Made by Clean Air—Dr. A. I. Ross (Medical Officer of Health, Bolton).

14.30—Open Session

## Thursday, 22nd October

10.00—Session Five

"Clean Air—The Balance Sheet".

(a) Industry's Viewpoint—E. J. Challis (Heavy Organic Chemical Division, Imperial Chemical Industries).

(b) The Domestic Viewpoint—J. Kay (Chief Public Health Inspector, Stretford).

(c) The Impact of a Clean Air Policy—Professor C. R. Lowe (Department of Social & Occupational Medicine, Cardiff).

"Clean Air—The Balance Sheet" (continued)

(d) The Viewpoint of the Fuel Industries.

(i) Solid Fuel—M. J. Edwards (Director (Domestic & Industrial) Marketing Dept., National Coal Board).

(ii) Gas—B. G. H. Clegg (Deputy Director of Marketing, The Gas Council).

(iii) Electricity—R. H. Phillips (Marketing Adviser, The Electricity Council).

(iv) Oil—Dr. A. W. Pearce (President, The Institute of Petroleum).

14.30—Session Six

## Friday, 23 October

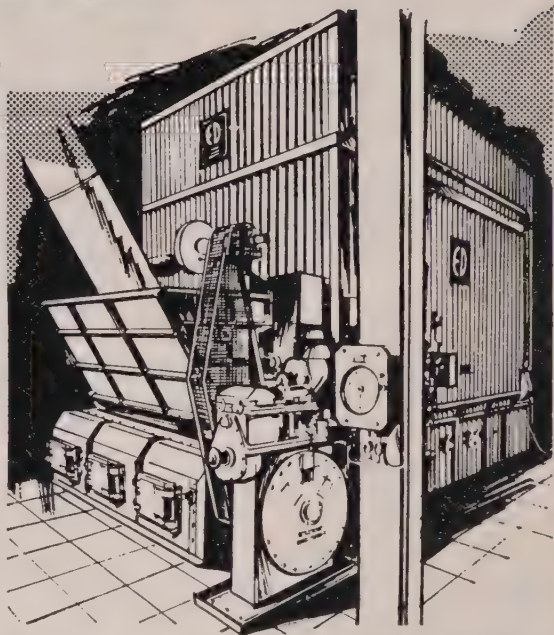
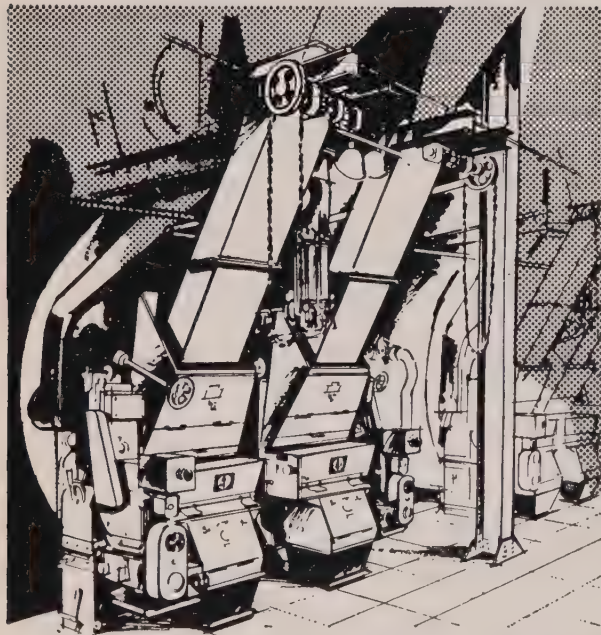
10.00—Session Seven

"Pollution from Road Vehicles".

(a) Recent Developments in Pollution Control—Dr. A. Thomas and R. Lindsay (Shell Research Ltd.).

(b) The Effects of Emissions—Professor P. J. Lawther and Dr. B. T. Commins (The Medical Research Council).

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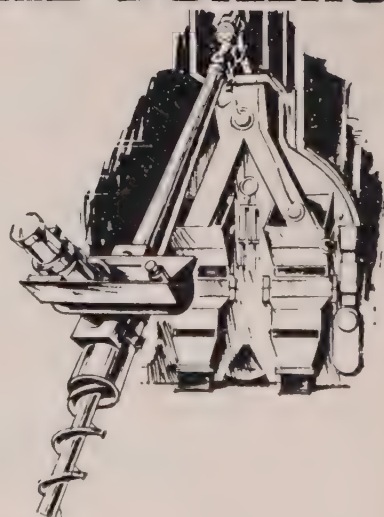
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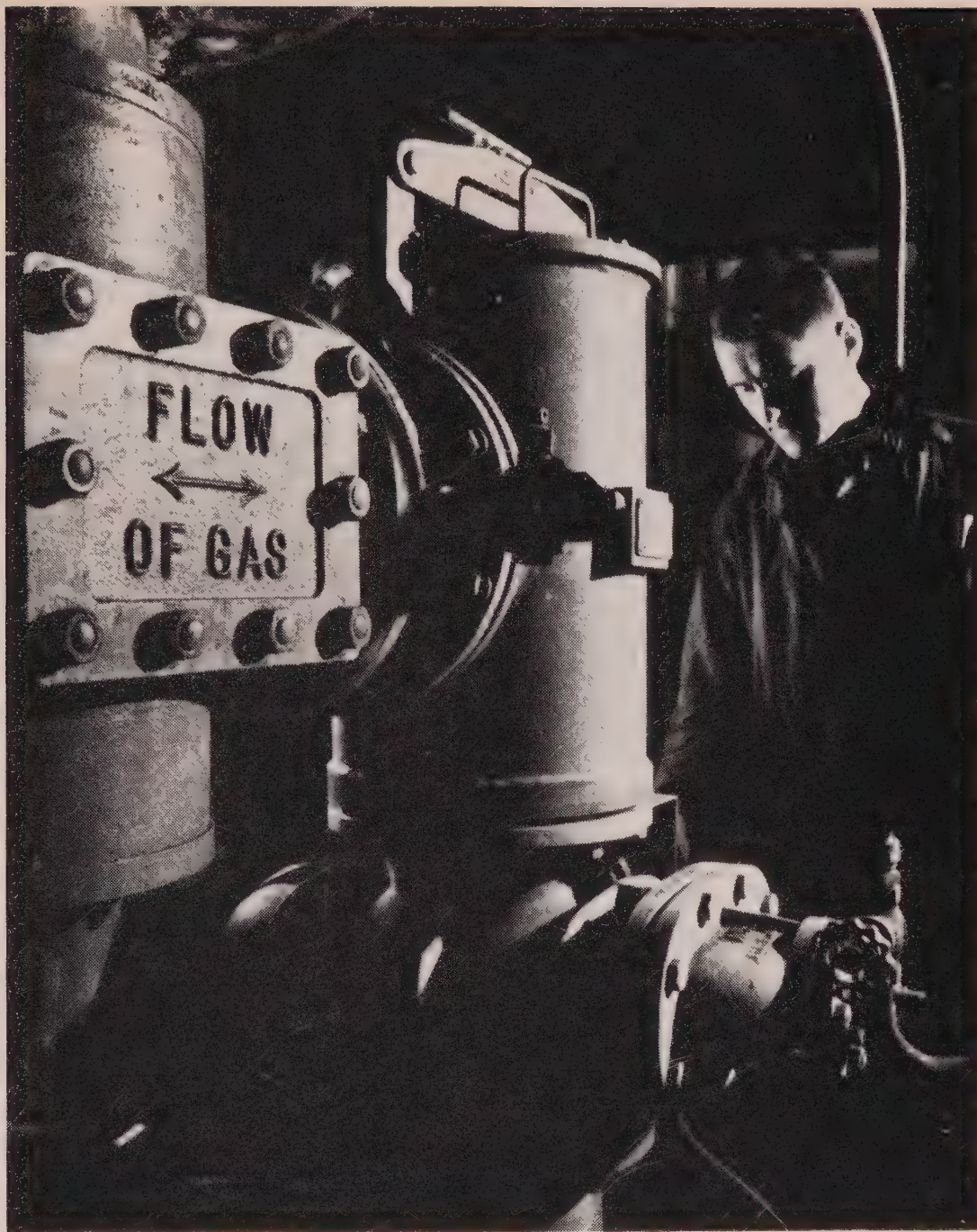
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## FLOW OF GAS

The Templeborough Rolling Mills Limited was the first continuous wire rod mill to be built in this country. Established in 1916, the company was a joint venture by E. & A. Smith Limited, William Cooke Company Limited, both in the wire and wire rope industry, and steel producers Steel Peech and Tozer Limited. Since that date the com-

pany, which has its production mill in Rotherham, Yorkshire on the site of a former Roman army camp, has pioneered many important developments and techniques in rod rolling.

The original mill was powered by two steam engines, had a producer gas-fired furnace and an ingenious type of leather belt drive to the four stands of the finishing mill. This



belt was 4' 6" wide and required the hides of 500 bullocks. Today Templeborough Rolling Mills has the first type of furnace in the industry capable of switching from natural gas to oil as a standby at four hours' notice from the East Midlands Gas Board.

Now jointly owned by British Ropes Limited and the British Steel Corporation, the Templeborough Rolling Mills Limited is regarded as being one of the most modern high carbon steel rod producers in the world, with an annual output of over 200,000 tons.

The new furnace which forms an integral part of the rod production process is of an original design—a Walking Beam Furnace designed and built by Priest Furnaces Limited—in which 12 metre billets are separately walked through the furnace and subjected to an efficient radiation heat raising the billet temperature to 1,250°C. At the Control Desk the progress of the billet through the furnace is monitored on a closed-circuit television.

The new furnace not only represents a major advance in that it permits the use of a heavier weight coil and achieves a more accurate control of heating with a minimum of decarbonisation, but it paves the way for future developments in the Mill which may lead to rolling speeds in excess of 8,500 ft. a minute and an even heavier coil weight.

The furnace is fired by Natural Gas which has been chosen for reasons of cleanliness, convenience and efficiency. The furnace burners have the facility for the rapid switch over to gas oil in case of necessity.

Natural gas supplies to Templeborough Rolling Mills Ltd., Rotherham, are the first on an *interruptible* basis for an industrial process other

than steam raising. With the introduction of further plant at the mill, supplies are expected to build up from the present rate of six million therms a year to 20 million, placing Templeborough's in the "big league" of industrial natural gas users.

Interruptible contracts for natural gas were introduced less than two years ago. They have won a quick acceptance from industrialists who in return for lower prices are willing to switch from natural gas to an alternative fuel, usually at times of peak gas demand.

Already the gas industry as a whole has contracted to sell more than 300 million therms a year on interruptible contracts and much more than this is currently under negotiation. Three hundred million therms is enough gas to fuel three million cookers for a year. It is also equivalent to about one-third of total annual gas sales to industry before the North Sea gas marketing drive started.

For the customer on an interruptible contract, natural gas is available at a lower cost than on the usual "firm" basis. He must have equipment capable of burning an alternative fuel. Experience shows that there is little problem here: dual-fuel equipment is widely available. The length of the interruption of natural gas supplies is privately negotiated between the gas industry and the industrialist and so is the notice of interruption required by the customer. Obviously the more flexible the arrangements the more it suits the gas supplier.

Interruptible contracts will play an increasingly important role in the gas industry's marketing drive. The overall target is to increase sales of gas to industry to seven times their pre-North Sea gas level by the mid-seventies.



# Clean air is automatic with clean electricity

*For clean air areas, the most natural choice is Electricity for space heating, water heating and air conditioning in home, industry and commercial buildings. Electricity is the only fuel that causes no combustion. It's always there to be switched on. Nothing to store. Nothing to dispose of.*

**Electric Central Heating.** Automatic, simple, cheaper to install than other systems. Runs on special low rates, and, of course, complies with Clean Air Act.

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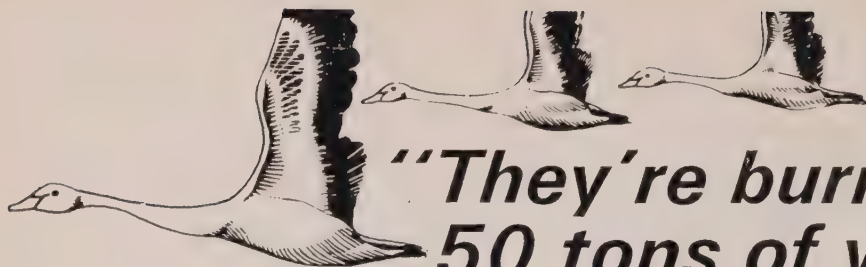
**Electricaire.** Warm Air Central Heating by Electricity. Essentially a central sited storage heater, warm air through ducts—controllable room by room. Ideal for new property.

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## Better things are electric

*The Electricity Council, England & Wales*



***“They’re burning  
50 tons of waste  
per day down there!”***



***“Well where’s the smoke?”***



***“And where’s the smell?”***



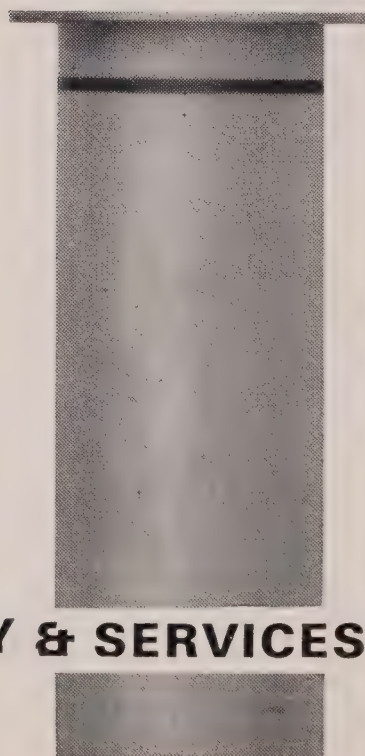
### ***There isn’t any!***

The Universal system of incineration ensures complete combustion of all waste materials. Sealed flame, three stage combustion with complete air control to all stages eliminates air pollution emissions, without smell, smoke or fly ash. Refuse reduced to 5% clean, dry sterile ash with a low fuel bill. Universal incinerators are efficient, compact, precision engineered units complete with a stainless steel stack of only 30’. In addition, the incinerator is designed to dispose of bulk refuse through the front opening on a refractorised trolley taking articles of up to 6’ x 4’ x 8’.

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# INDUSTRIAL COLUMN

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## **Simon Engineering in Outline**

"An engineering group of unusual if not unique diversity" is the description applied to itself by Simon Engineering in a newly-published brochure which illustrates and concisely describes the varied activities of the company's 40 home and overseas subsidiaries.

Titled "An Outline of Simon Engineering Ltd." it contains an alphabetical listing in the end pages of 167 principal products and services from access equipment to water engineering; included are multi-million-pound chemical complexes, flour mills, firefighting Snorkels, steelworks equipment and biscuit-making machinery. There is a list of 25 principal industries and utilities supplied by Simon, well over half of whose work is carried out overseas.

Well featured and of particular relevance in European Conservation Year are aspects of environmental engineering which include plants and equipment for refuse disposal, sewage treatment, food hygiene and for the control of air and water pollution.

Copies of the brochure are obtainable free from Simon Engineering Ltd., Publicity Department, Stockport, Cheshire.

## **Vulcan NP Gas-fired Boilers**

The range of boilers offered by Hattersley/Stelrad now include the VULCAN NP models.

These have been developed in order to complement the already successful VULCAN TN and VULCAN AUTOSTAT series of boilers with their sophisticated built-in control facilities, to satisfy the needs of the Guaranteed Warmth Scheme, and to meet the demands of estate developers.

Manufactured as basic electric models with simplified electrical connection and connection to control units, the NP boilers of cast iron with fireproof cast iron base have been specifically designed, not only to simplify and speed up installation, but to ensure simple ignition and minimum servicing.

There are two ratings: 33,000 BTU/hr. and 40/50 BTU/hr. available for conventional or balanced flue installation.

## **Pollutants in Gases**

BCURA Industrial Laboratories have published a further Industrial Service Leaflet. It outlines BCURA's extensive facilities and long experience in the sampling and analysis of solid, liquid and gaseous pollutants.

Measurement of solids emission from chimneys, for example, is made by the method specified by the Minister of Housing & Local Government in Statutory Instrument No. 68/431 using the well-known BCURA design of grit and dust sampling apparatus.

Copies of this leaflet, which is entitled "Pollutants in Gases" can be obtained from the Public Relations Officer, BCURA Industrial Laboratories, Randalls Road, Leatherhead, Surrey (Tel. Leatherhead 4411).

## War on Air Pollution with New System

As the crew of Apollo 11 stepped out of the recovery helicopter into their quarantine van, a bystander was heard to remark "Lucky guys . . . three weeks of freedom from the smog."

Later the space programme directors were describing future plans for the colonisation of the moon. Someone observed that, if space explorers kept to the task, they just might make the moon fit for human habitation by the time the earth becomes unfit.

Concerning the problem of continued existence on our own planet, a new Philips system for the detection and eventual control of air pollution has been introduced by Pye Unicam Ltd. of Cambridge.

Known as the Philips SO<sub>2</sub> monitoring system it is based upon a sensing device using the 'coulometric' method of measuring the sulphur dioxide content of the air.

Although there are always a given number of substances contributing to the pollution of a given air space, sulphur dioxide (SO<sub>2</sub>) is almost always present. When there is an increase in SO<sub>2</sub> concentration, relative to the normal concentration, this is an indication of a corresponding increase in the concentration of all other pollutants. Thus SO<sub>2</sub> is used as a convenient 'tracer' for the measurement of pollution level.

To give a demonstration of this new system it is best to refer to the Rijnmond area of Holland where such a system has recently been opened. The opening of the 'Rijnmond Network' marks the first step towards a fully automated air pollution monitoring network covering the entire Netherlands. Therefore this heavily industrialised



The Phillips: SO<sub>2</sub> Sensor

region bordering the port of Rotterdam was considered suitable for such a start.

Throughout this area some 31 SO<sub>2</sub> sensors are located. These sensors work on the 'coulometric' principle in which the measurement of SO<sub>2</sub> is accomplished by titration with Br<sub>2</sub>.

The information gained from these sensors is transmitted automatically to a computer centre, where the continuous flow of information is processed statistically, and stored by means of a Philips computer.





The control room

When the pollution level exceeds a preset threshold value the computer automatically sounds an alarm. The control station operator then asks for a weather forecast. If the combination of pollution and weather data indicates a high pollutive potential, the operator may contact industries in the region, requesting them to restrict emission of all sorts of pollutants especially odorous compounds.

Human institutions are habitually limited or described in terms of geography. But the air above the earth is aware of no such limits. The fundamental assumption upon which the Dutch system is based is that nothing less than a national network will be sufficient to deal with the problem. The fact is of course, that much of the air pollution over a given country at a given time may have originated from pollution sources in other countries, so the ultimate solution will have to be international.

### **Natural Gas Conversion 1970/71 Programme**

By 31 March 1970, the appliances of 1,580,000 industrial, commercial and domestic gas customers had been converted to natural gas since the programme started in late 1967/8—11.9 per cent of the industry's 13,300,000 customers. Ten of the 12 Area Gas Boards were converting during the last 12 months.

In 1970 the two remaining Boards—Scottish and South Western—will start their programmes. The provisional plans for 1970/71 are that 2,086,000 customers will be converted during the year—more than the total in the first three years. This will bring the number of customers using natural gas at 31 March 1971, to 3,666,000—over 27 per cent of total customers.

Some Boards will convert certain industrial customers in a few areas in advance of the general programme, where existing or planned distribution pipes make this possible. Natural gas has already been brought to some industries in this way.

## **Cat-Ox System**

Simon-Carves Chemical Engineering Limited—or SIM-CHEM to use the abbreviated name by which they are better known—have signed an agreement with Monsanto Enviro-Chem Systems Incorporated of Chicago, U.S.A., for a licence to market and install the Monsanto Cat-Ox system. The Cat-Ox system is designed to remove sulphur dioxide and fly ash from flue gases emitted by power stations and other large industrial plants. It does this efficiently. Virtually all fly ash is removed together with either 85 or 90 per cent of the sulphur dioxide depending upon whether the Cat-Ox system is installed as an independent system or integrated into the boiler design. The system converts the sulphur dioxide removed into usable sulphuric acid which can be sold commercially. It is known that  $\text{SO}_2$  and fly ash are two major pollutants produced by many large industrial plants and social pressure to reduce further the emission of the potentially harmful materials by industry is increasing.

### *Reducing atmospheric pollution*

The development of the Cat-Ox system is especially important at this time and this is underlined by the fact that this is European Conservation Year. As the world becomes more highly industrialised the volume of waste by-products of industrial processes continually increases. Many of these are harmless but many are potentially harmful to nature and to man. If man is to control and eventually reduce the pollution of his environment he must, first, capture the harmful by-products and, secondly, find some useful purpose for them. And this is precisely what the Cat-Ox system does.

The sulphur dioxide removed from the flue gases is converted by a catalytic process into sulphur trioxide and then into 80 per cent sulphuric acid. The acid produced can be sold and the revenue earned helps to offset the costs of operating the system. In ideal circumstances a profit could be made from acid sales and then the system would justify its use on a straight commercial basis. In the U.K. it is unlikely that this would apply but application of the system could present this country with some overall trading advantages.

## **Merger of J. M. Hargreave (Products) Ltd. and Westair Dynamics Ltd.**

Effective from 1 May 1970, the merging of the trading operations of these two companies will lead to increased operational efficiency with a consequent lowering of costs. "In addition," said Mr. J. M. Hargreave, Chairman, "the merging of the technical know-how of our two Associated Companies will greatly strengthen the development of our Electrical Division."

Westair Dynamics Limited are a growing company specialising in air-processing equipment and sophisticated lighting systems. Known throughout the trade for their work as agents for Hitachi airconditioning units, the company also manufacture dehumidifiers and flameproof lighting equipment.

## **Peabody at Achema. June 17-24**

Peabody's new Ventri-Slot high energy gas scrubber is being exhibited in Continental Europe for the first time at Achema, in Frankfurt, West Germany, 17-24 June.



### **New Heaters from Eltron**

"ELTRON" Introduces a NEW RANGE OF ELECTRIC AIR DUCT HEATERS which they claim have a longer working life. These heaters are fitted with NEW "ELTRON" large diameter elements having a low watts density and therefore low working surface temperature thus giving longer life.

Heater case sizes are tailor made to suit customers' exact duct size, whether square or rectangular, thus doing away with the necessity of fitting expensive tapered connecting duct pieces. Tailor made cases can be fitted in false ceilings or recesses where it is often difficult due to lack of space to fit a standard unit. The range covers 1/2 kW to 500 kW loading and heaters can be connected in any number of equal single phase or 3 phase stages. Hand reset safety cut-outs are fitted as standard.

A DCE Moldow Installation

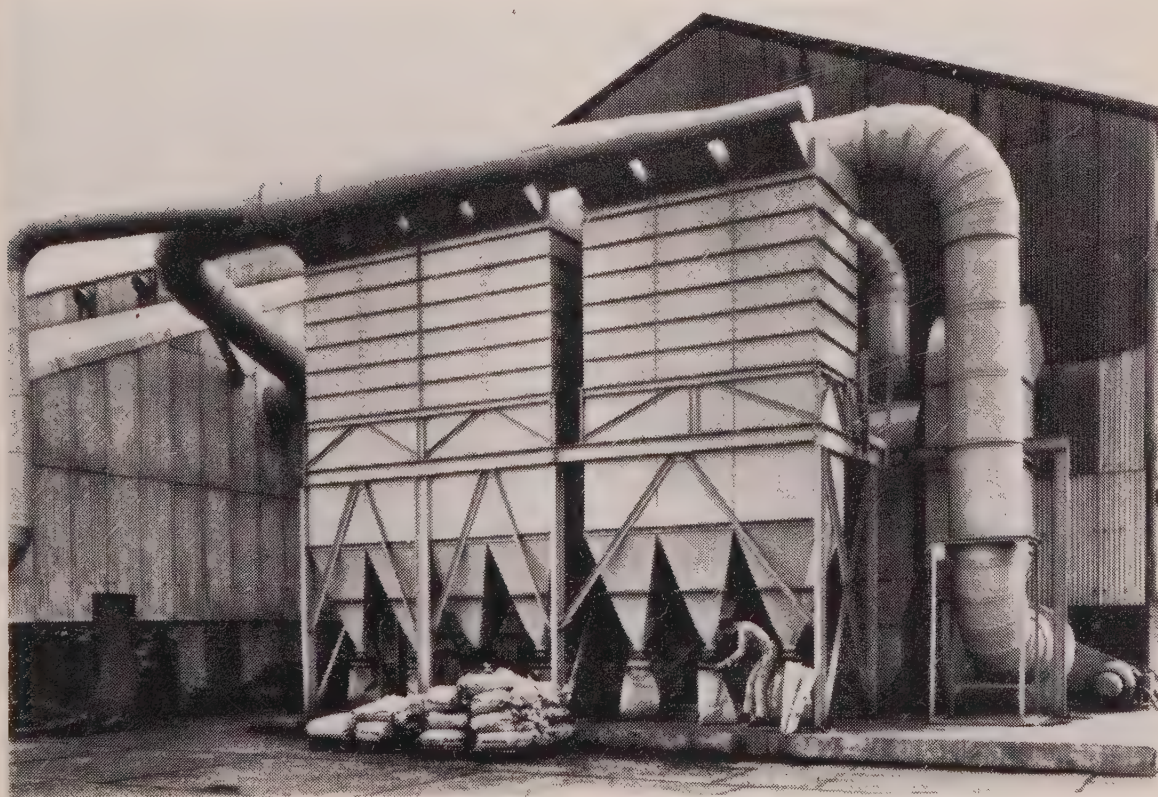
### **CoID Award for Redfyre Savannah**

A 1970 Council of Industrial Design Award has been won by the Redfyre Savannah solid fuel warm air unit.

### **DCE at the 1970 Mechanical Handling Exhibition**

DCE—Dust Control Equipment Limited—of Thurmaston, Leicester, exhibited a wide range of their precision dust filtration systems at the Mechanical Handling Exhibition at Earls Court.

There was also a complete DCE Moldow dust filtration system on the stand. The DCE Moldow is new to this country, and was being shown for the first time. It will initially be applied to handling woodwaste in large woodworking plants. DCE Moldow systems have a number of important advantages over more conventional dust control installations.







Gas Council stand at R.S.H.

### **Gas—A Smokeless, Non-Pollutant Fuel**

The increasing contribution which the British gas industry is making to the nation's health is reflected in a Gas Council display staged at a Royal Society of Health Exhibition at Eastbourne.

The display is aimed at local and central government bodies and commercial concerns whose establishments require a reliable fuel if they are to operate efficiently. In any such building—school, hospital or large hotel—a changeover to gas will have beneficial effects on the immediate environment regardless of the fuel which gas is replacing. Gas will not pollute the atmosphere. It is a smokeless fuel with an important bonus in that it contains very little sulphur. This factor is enhanced in natural gas, which is also non-toxic.

### **New Leaflets on Chimneys and Tanks**

New leaflets have been published by W. E. Rodell and Son Ltd., Eggington, Leighton Buzzard, Beds, describing their steel chimneys for all types of boiler plant, and steel tanks for oil or water storage.

Rodell steel chimneys are made to site requirements to maximum economic height in any diameter and may be guyed or self-supporting. The company make mild-steel chimneys, aluminium-clad chimneys with  $\frac{1}{4}$ -in. air space, rockwool-insulated aluminium-clad chimneys, and insulated multi-flued chimneys.

Storage tanks are made in cylindrical or rectangular form and provided with internal bracing to prevent deflection.

The company also manufacture insulated chimney liners.





### **Warmlife for the Elderly**

Picture shows the attractive square surrounded by the 15 cottages built by the Neston and Parkgate Housing Association to house old 'age pensioners.

### **Clean Air Contracts for Buell Ltd.**

Further orders amounting to over £200,000 for the design, manufacture, erection and commissioning of dust collection plant and reactor cyclone system have been received by Buell Ltd., the subsidiary of Lodge-Cottrell Ltd., Birmingham.

The British Sugar Corporation, with offices in Peterborough, have ordered a large dust collection plant for handling 450,000 cubic feet a minute of gases used for drying beet sugar pulp. Similar plant, complete with specialised ducting for an IFD cooling system, has been ordered by the Central Electricity Generating Board for their Dungeness 'B' Power Station.

The complete Burmah Warmlife Flexiplan system has been installed in the cottages controlled from one central point thus cutting out any need for the residents to have to be involved in manual labour.

### **G.W.B. Woodwaste Boiler Commissioned in Canada**

The first wood waste fired boiler of its kind to be installed in Canada has been recently commissioned at the television cabinet manufacturers Middlesex Furniture Company, Strathroy.

The boiler, although in the main manufactured in Canada under licence from G.W.B. Boilers, had its sophisticated parts direct from the English factory with the supervision of installing and commissioning carried out by Mr. J. Penzer, who was flown out by G.W.B. Ltd. to act as Consulting Engineer.



## **Pollution Control at Battersea "B" Power Station**

The Central Electricity Generating Board have sought authority to cease the washing of flue gases at Battersea "B" Power Station for an experimental period of 2 years.

The object of gas washing (which was a condition of the authorisation to construct the power station in 1948) is to remove a high proportion of the sulphur oxides from the chimney gases. This it does, but the process of wet washing has the disadvantage of cooling the chimney gases and reducing the speed at which they leave the stack. Since 1948 there have been advances in theoretical and practical knowledge about the behaviour of chimney plumes. Experience has shown that cool, washed gases often fall rapidly to ground, especially in certain atmospheric conditions, and create an unpleasant mist and smell near the power station, whereas unwashed plumes from similar chimneys, discharged at higher temperatures, do not do this. A cessation of washing should also improve the condition of the lower reaches of the Thames because of the reduction in the discharge of effluent.

After consultation with the Minister of Housing and Local Government, the Minister of Technology has authorised the suspension of washing for the experimental period. The effects will be monitored both in the immediate vicinity and over a wider area in co-operation with the local authorities concerned.

If necessary, washing could be resumed at short notice and the Central Electricity Generating Board have agreed that they would do so at the request of the Minister.

Gas washing at Battersea "A" must continue, because the plant which removes the sulphur oxides also removes the grit and dust.



The Baxi "Capri"

### **New Open Fire from Baxi**

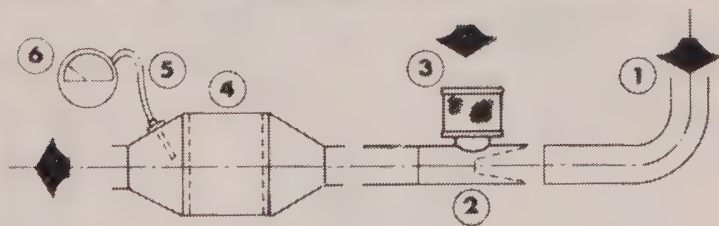
A new open fire has been added to the range manufactured by Baxi, Bamber Bridge, Preston, Lancs. Named the 'Capri', it is an inset open fire with a drop front and may be used simply as a space heater, or in conjunction with the company's ROB 2 back boiler, to provide hot water for domestic purpose and central heating radiators.

The Capri, which joins the Burnall underfloor draught open fire and the Fantom forced draught open fire in the Baxi range of solid fuel appliances, will retail at £7. It is made in 16 in. size only.

### **Licence for American Incinerators**

Hygrotherm Engineering Ltd. announced recently that they have taken out a licence from Hirst Construction Engineers of California for the design, fabrication and supply of incinerators for noxious liquids and gases ranging from hydrogen sulphide through to organic tar wastes.





The PTX Purifier

### Exhaust Fumes—New Catalytic Purifier Solves B.E.A.'s Problems

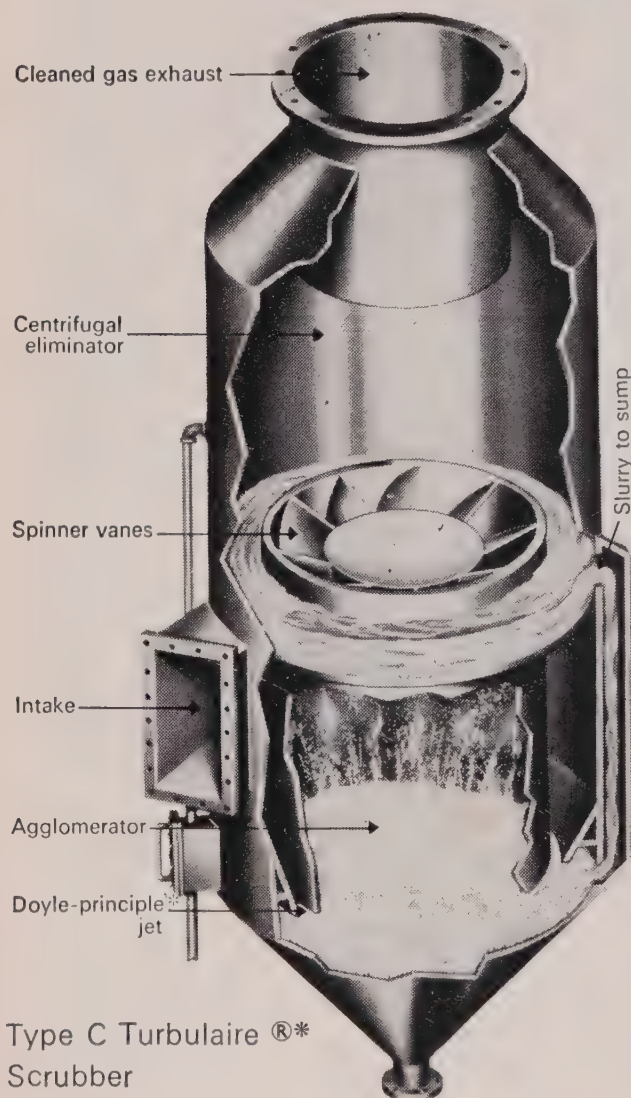
A catalytic exhaust gas purifier developed by Engelhard Industries has solved the problem of carbon monoxide fumes inside the British European Airways cargo and baggage handling terminals at Heathrow.

In BEA's experience, forklift trucks powered by internal combustion engines give the service required, but exhaust gases are a real problem. The cost of working in such a fume-laden atmosphere can be counted in terms of lowered efficiency, accidents, illness and damage to products.



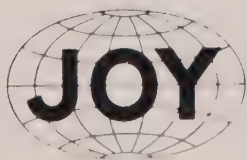
# New Gas Scrubber With 10 Advantages

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- 4** Wide open design eliminates plugging—cleans gases containing over 20 grs/cf of dust without need for pre-cleaners.
- 5** Pressure drop and efficiency custom engineered to meet each individual application.
- 6** Simple field modification adapts unit to maintain constant efficiency at varying volumes.
- 7** Can be furnished in a variety of materials for corrosion resistance, etc.
- 8** Three space-saving configurations; same principle, same efficiency.
- 9** Low wet-zone velocities eliminate attack by abrasive slurries.
- 10** Delivers cleaned, cooled gas to stack or process.

\* U.S. Patents 2,621,754 and 2,720,280



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# PEOPLE

## IN THE NEWS

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### Head Wrightson Board Appointment

Head Wrightson announce that Mr. Kenneth Home, M.Sc., M.I.Mech.E., M.I.C.E., A.M.I. Struct.E., has been appointed a Director of Head Wrightson Process Engineering Limited.

He joined Head Wrightson in January 1961 as Site Engineer and went to India in 1965, in charge of the Steelworks site at Durgapur. He was appointed Construction Manager, Head Wrightson Iron & Steel Works Engineering Limited on 1 August 1966, and was then responsible for the organisation of all U.K. site works.

On 7 October 1968, he was appointed Chief Project Engineer and Deputy Project Manager with Taywood Wrightson Ltd. at Southall when the company was formed jointly with Taylor Woodrow, and he has been the leader of the team carrying out the engineering for the building of the Aluminium Smelter at Invergordon.

He will now be based at the headquarters of Head Wrightson Process Engineering Limited, at Thornaby.

Mr. J. McCrone has been appointed Chief Project Engineer and Deputy Project Manager to the Taywood Wrightson organisation in his place and will be the Head Wrightson senior representative located in the Southall office.

### Gas Council Appointments

The Gas Council announces the appointment of Mr. Ivan J. Whitting, M.A., as Operational Research Manager.

Aged 37, Mr. Whitting joins the Gas Council from the Ministry of Technology, where he was employed as Chief Statistician in charge of the Model Building and Analysis (Energy) Branch. He will head a comparatively new department set up in 1967 within the Council's Economic Planning Division.

The Gas Council has appointed Mr. W. A. Fitzsimons, B.Sc.(Eng.), C.Eng., F.I.Gas E., M.Inst.F., as Chief Industrial Engineer. He succeeds Mr. R. F. Hayman, who has recently taken up the new position of Director of the Confederation for Registration of Gas Installers (CORGI).

Earlier this year Mr. Fitzsimons spent three weeks in the U.S.A. and Canada studying the engineering standards and the performance of dual-fuel steam raising installations in industrial and public utility power plants.

The Gas Council has created a new post of Transmission and Distribution Planning Engineer, an appointment which is to be taken up on 1 April, by Mr. C. H. Townsend, B.Sc.(Eng.), A.C.G.I., F.I. Mech.E., F.I.Gas E., A.M.Inst.F., at present Distribution Engineer to the South Eastern Gas Board.

This new appointment reflects the Gas Council's comparatively recent and increasing involvement in transmission programmes necessary for the distribution of natural gas from the North Sea. Mr. Townsend will be concerned with not only the Council's own national pipeline grid and control system but also with the development of new techniques for the industry as a whole.

### **Corgi Committee Chairmen Appointed**

Two important stages in the development of CORGI—the Confederation for the Registration of Gas Installers—are announced today: the appointment of the Chairmen of CORGI's 12 regional committees; and the publication of a booklet on gas installation quality standards.

CORGI, which is a voluntary association formed between trade organisations, Area Gas Boards and the Gas Council, aims to promote safe and satisfactory standards in the installation of pipes, fittings and appliances.

The regional committees, the members of which are now being nominated, will be compiling lists of gas installers whose names will appear on the CORGI Register. One of the regional committees' tasks is to ensure that all who are enrolled on this Register maintain proper standards. They will also consider applications from gas installers applying for registration.

The Secretary of CORGI is Mr. K. A. Ramsey.

### **Thermotank Products Appoint Export Manager**

The first Export Manager of Thermotank Products, a division of Hall - Thermotank International Limited, is Mr. Peter Livesey.

Mr. Livesey, who is 26, joined the Thermotank organisation more than three years ago and was latterly New Products Manager.

In his new role, Mr. Livesey will be responsible for the sale of all products manufactured or distributed by Thermotank Products to any overseas market. He will also undertake appointment of and liaison with distributors, agents and licensees.

### **Peabody U.K. Managing Director Joins Board of U.S. Parent Company**

Mr. Denis A. Monk, Managing Director of chemical and combustion engineers Peabody Limited, of London, has been appointed a director of the Peabody Engineering Corporation of Stamford, Connecticut, U.S.A.

The international Peabody organisation is a member of the Peabody Galion Corporation of New York, specialist manufacturers of equipment for environmental and pollution control.

### **Holmes Board Appointment**

Mr. Frank Broomhead was appointed to the board of directors of W. C. Holmes & Co. Ltd. on Monday, 20 April.

Mr. Broomhead joined the company in 1937 after having obtained a first class honours degree in gas engineering at Leeds University. Following six years of plant development and commissioning, he was transferred to London in 1943, and was subsequently appointed London Manager in 1954. Mr. Broomhead returned to Huddersfield in 1966 as Manager of the Process Plant Section of the Sales Division.

### **New Managing Director for Lodge-Cottrell**

Mr. P. D. Taylor has been appointed Managing Director of Lodge-Cottrell Limited air cleaning and water clarification engineers, and chairman of its subsidiary company Buell Limited.

Mr. Taylor has been a director of Lodge-Cottrell since 1958 and he succeeds Mr. H. G. T. Busby, who has retired, but is retained as a technical consultant.



### **New General Secretary for WGF**

The newly appointed general secretary of the Women's Gas Federation took up her position on 9 March. She is Mrs. Celia Gimpel, who for the past six years has been general secretary to the Women's Advisory Council on Solid Fuel.

Mrs. Gimpel studied modern history at Lady Margaret Hall, Oxford. After graduating with a B.A. (Hons.) degree, she worked as an administrator in H.M. Treasury for ten years, and in 1959 she became general secretary to the National Council of Women of Great Britain.

She feels that her experience of women's organisations will be a tremendous asset in her new job. One of her primary concerns is that women should be encouraged to use all their varied abilities, whether as homemakers or in outside jobs.

"Good housekeeping is essential," said Mrs. Gimpel, "but I'd like to see women taking greater interest in activities which are not connected with the home."

Mrs. Gimpel's appointment is of particular significance to the Gas Industry, which has a special relationship with the Women's Gas Federation. The Federation is independent of, but greatly concerned with the Gas Industry, and therefore its members are in a position to form a judgment of what is being done and relate this to the views of the people they meet.

### **G.W.B. Boilers Limited Appoint New Works Manager**

Mr. Alan Brown, C.Eng., A.M.I. Mech., M.I.W.S.P., has been appointed Works Manager for G.W.B. Boilers, Dudley, a Parkinson Cowan Company. Mr. Brown joins the company from G.E.C. Power Engineering, Stafford.

### **Mr. N. C. Lake President of the Iron & Steel Institute**

At the Annual General Meeting of the Iron & Steel Institute on Wednesday, 6 May, Mr. N. C. Lake, Deputy Managing Director of Head Wrightson & Co. Ltd., was appointed President.

For a number of years he has been a Director of Metallurgical Equipment Export Company, Indian Steelworks Construction Company Limited and British Steelworks Equipment Limited.

He was the founder President of the Metallurgical Plantmakers Federation from September 1967 to September 1969, and remains a member of the Council of that Federation. He is at present Chairman of the British Metalworking Plant Makers' Association (formerly known as Steel Works Plant Association and of which he was Chairman in 1952/53 and 1959/60).

Mr. Lake is Past President of the Cleveland Institution of Engineers and the Cleveland Scientific Institution, a Fellow of the British Institute of Management, Past Chairman of the North East Regional Council of the British Institute of Management, a member of the Advisory Council and Technical and Research Collaboration Committee of BISRA, a member of Council of the British Non-Ferrous Metals Research Association and was until recently a Member of the Main Council and the Northern Regional Council of Confederation of British Industry.

He has travelled extensively throughout the world on business.

### **Marketing Appointment at N.C.B.**

The National Coal Board have appointed Mr. K. Part to be Deputy Regional Marketing Director of their London & Southern Sales Region.

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## EXHIBITION

A complete pre-fabricated and self-contained "Clean-Air" Exhibition; adaptable in size with one, two, three or four approved smokeless appliances under fire, and displays of the smokeless fuels available in the district; also a self-contained exhibition unit for use with House Improvement Schemes.

## MOBILE UNITS

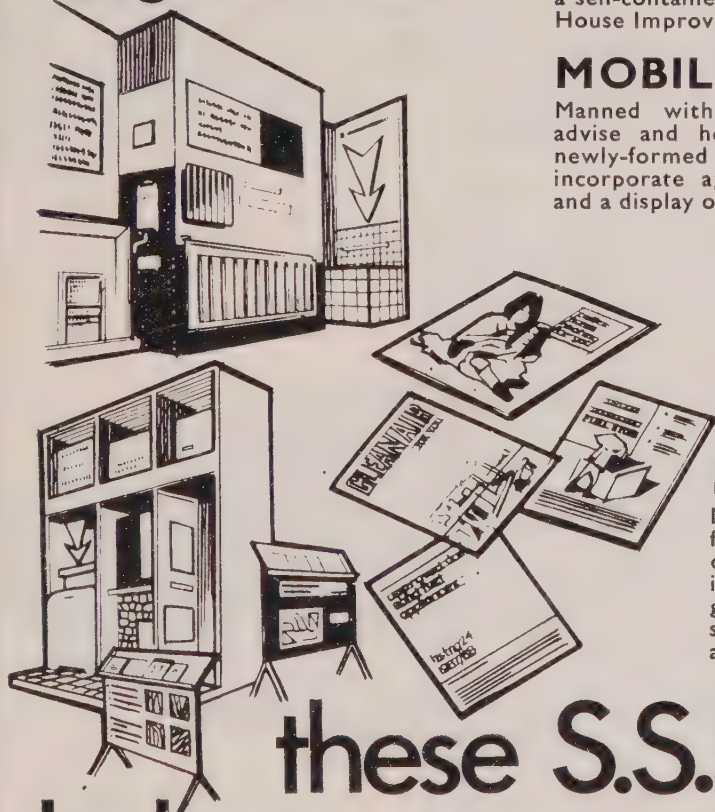
Manned with technical demonstrators, to advise and help residents in proposed or newly-formed Smoke Control Areas. They incorporate approved appliances under fire and a display of the solid smokeless fuels.

## DISPLAYS

A range of portable units variously displaying instructional panels dealing with Clean Air and the Act, House Improvement Schemes, a typical central heating unit, fuel displays and literature displays

## LITERATURE

Informative literature is available free for Local Authorities to distribute to the public, explaining the Clean Air Act, and giving full information on solid smokeless fuels and the appliances.



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The comprehensive services offered free by the Solid Smokeless Fuels Federation can make an invaluable contribution to "Clean Air" campaigns, the implementation of Smoke Control Areas, and the organisation of House Improvement or Conversion schemes.

Local Authorities who are interested in utilising the aids shown above are invited to apply to the address below.

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the answer  
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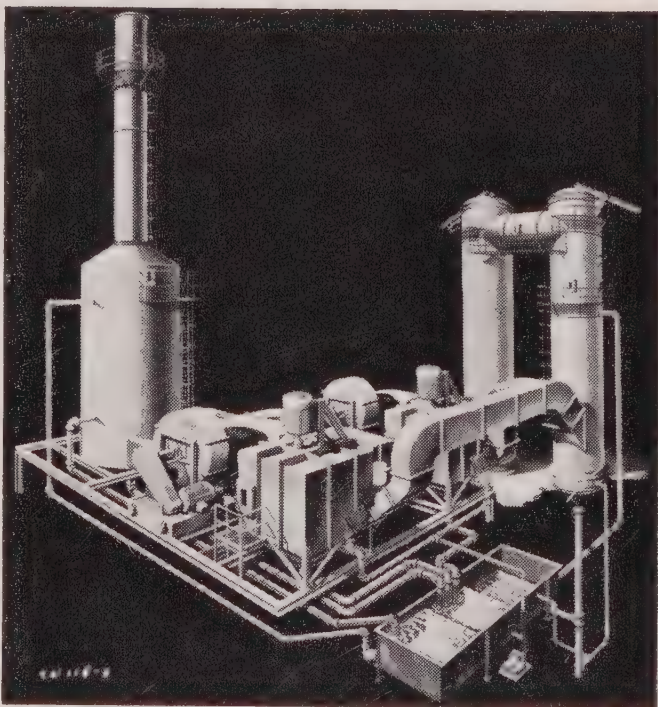
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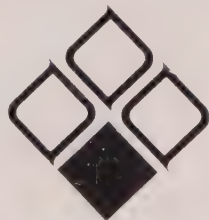
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Since the mid 'fifties' a massive programme of investment in plant and distribution facilities has led to a ten-fold increase in turnover—today running at some £6 million a year, and increasing still.

Manufacturing facilities at key mining locations in England and Scotland.

Rexco looks forward to the day when smoke is a thing of the past—and the Rexco Group of Companies will be proud to have been pioneers in the process.



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**National Carbonising Company Ltd.**  
**Mansfield, Notts.**



# SMOKELESS AIR

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JOURNAL OF THE NATIONAL SOCIETY FOR CLEAN AIR

No. 155

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AUTUMN 1970

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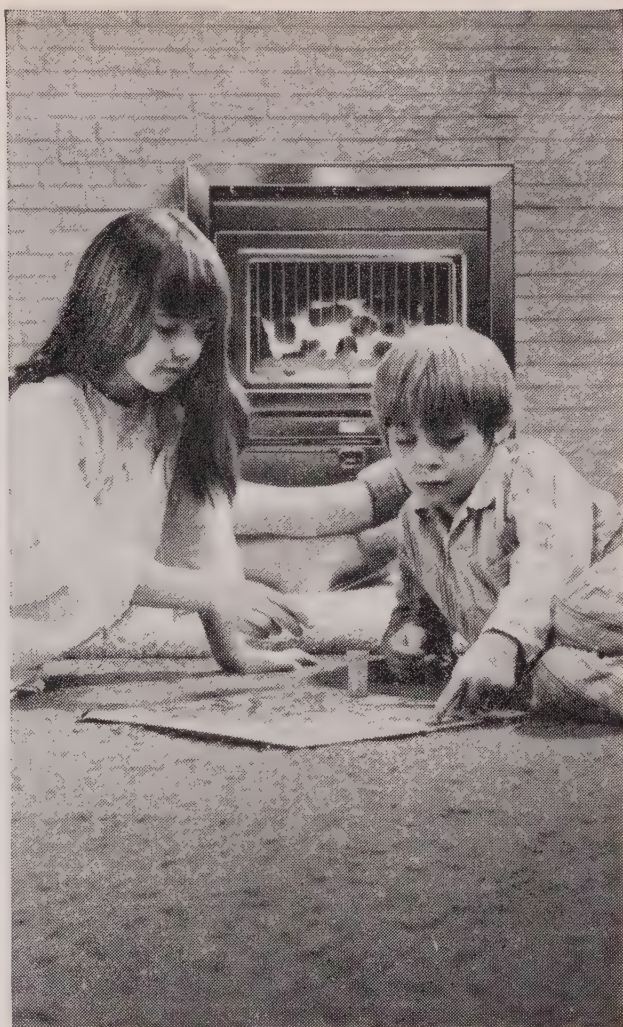
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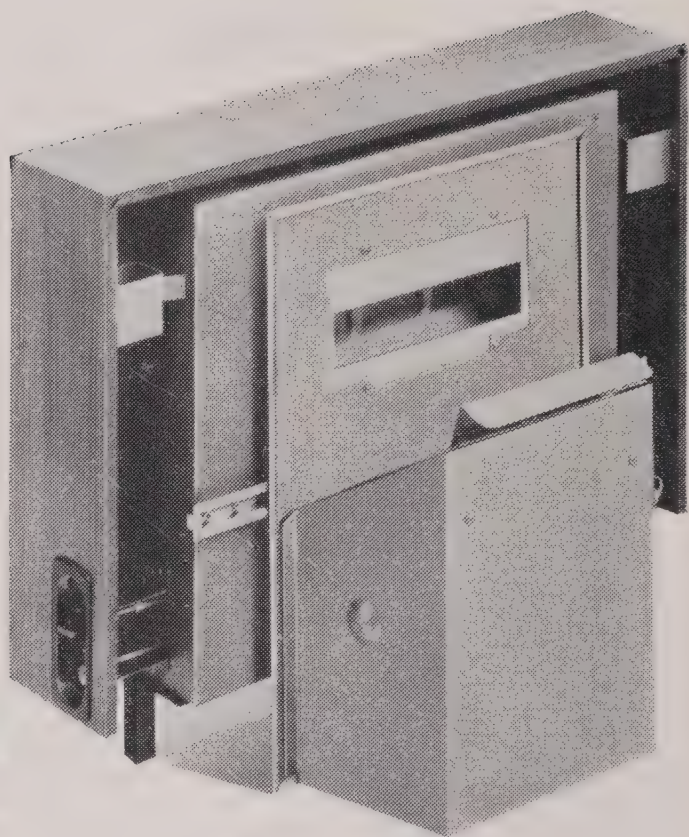
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# SMOKELESS AIR

Vol. XLII No. 155

Autumn 1970

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*Ships, towers, domes, theatres, and temples lie  
Open unto the fields, and to the sky:  
All bright and glittering in the smokeless air*

# SMOKELESS AIR

## *The Annual General Meeting*

The Society's Annual General Meeting was held at the Connaught Rooms in London the 5th June. This preceded the address by Mr. Christopher Chataway, which is reproduced in full later in this issue. The meeting was well attended, and this year more time was allowed for the conduct of business. And a lively discussion ensued on a number of occasions about the shortage of solid smokeless fuels, pollution from road vehicles, the effects of fluorides and the possibility of the Society enlarging on its present activities.

The election results for the divisional representatives to the Council showed a few changes. We should, therefore, like to take this opportunity of paying tribute to those who have recently retired after rendering very valuable services to the Society for a long time. Two who should be mentioned by name are Mr. James Goodfellow, a past Chairman of the Society and for many years Secretary of the Yorkshire Division, and Mr. J. S. Hodgins who was Secretary of the South East Division. We thank them for their work in the Society and wish them a very happy and long retirement.

The Open Meeting which followed the Annual General Meeting was extremely well attended and all enjoyed the lively address from Mr. Christopher Chataway. We are indeed grateful to him for finding the time to come and address us in the middle of an important election campaign.

## *The Clean Air Conference at Southport*

The Annual Clean Air Conference at Southport will be opened on Tuesday, 20 October, by Mr. Eldon Griffiths, M.P., the Joint Parliamentary Secretary at the Ministry of Housing and Local Government. Mr. Eldon Griffiths will be well known to many of our members as President of the Association of Public Health Inspectors.

It will be recalled that originally the Earl of Bessborough had agreed to open the Conference, but following the recent general election and change of Government, Lord Bessborough has become responsible for aviation matters in the Ministry of Technology and it was thought more fitting that a member of the Government more closely concerned with clean air matters should take his place. We are, therefore, very fortunate in having Mr. Eldon Griffiths to open the Conference and Exhibition and to present the first Arnold Marsh Clean Air Awards.

## *The Society's New Offices*

The move of the Society's Headquarters from Breams Buildings to Brighton was successfully completed on the weekend of July 11th and 12th. The furniture, files, books and the whole contents of the library left London on the Saturday, were delivered at Brighton on the Sunday and by Tuesday morning the offices was very nearly back to normal.

The new offices are extremely bright and airy and we hope that as many members of the Society as possible will visit us whenever they happen to be in Brighton. Brighton is a popular conference town and we know that many members do visit it for that reason. If you are doing so please come and see us; you will be extremely welcome.



Reception





The Library

### *Smokeless Westminster*

On the 1st July the City of Westminster completed its smoke control programme and the whole City is now subject to smoke control orders.

This achievement was celebrated on the 30th June when the Lord Mayor and Council of the City of Westminster gave a reception for members of the Clean Air Council.

Although this was not one of the best evenings for visibility, the view from the Lord Mayor's Parlour at the top of Westminster City Hall did show how much cleaner is the air of London as a whole. "Smokeless Air" would like to take this opportunity of congratulating the City of Westminster on this considerable achievement.

### *Gas Powered Taxis*

Mr. Vernon Cook, who runs a fleet of 125 taxis has recently converted 12 of them from petrol to propane gas.

One of the great advantages of the use of propane gas is that it is very much cleaner and virtually causes no air pollution. The gas is also cheaper and it causes less engine wear. We understand that this experiment has been permitted by the Home Office and it is proving extremely successful, so much so that Mr. Cook hopes in time to convert his whole fleet to gas.

We hope indeed that this experiment will be successful, that Mr. Cooke will be able to convert the rest of his fleet and that other taxi owners will follow his example. If all the taxis in our cities ran on gas, this would effect a considerable reduction in the amount of pollution in our busy streets.



# interested in a Clean Air Campaign or house improvement scheme?

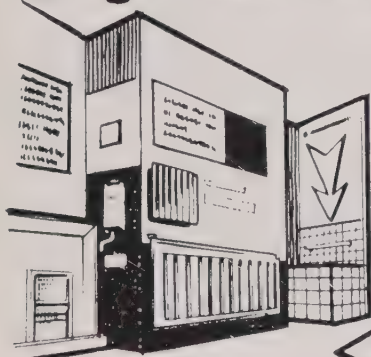


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# Cleaner Air in the Seventies

By Christopher Chataway

Address to the Society's Annual Open Meeting in London  
on 5th June 1970

Mr. President, Ladies and Gentlemen, I am grateful to have the opportunity of addressing this Society, if only because clean air has been an interest of mine for some while. I had the rather alarming experience of living in the same staff house with Sir Hugh Beaver early in the 1950s. He was then the Managing Director of Arthur Guinness Son & Co., I was its latest trainee executive and there was a staff house for bachelor executives. He was a widower and I was, alas, the only bachelor and I had, therefore, the formidable task on many occasions of trying to start some reasonable conversation at breakfast time, at lunchtime or at dinner time. And while I was advised that Sir Hugh liked to have conversation with meals, I rapidly discovered that if you embarked on a topic of conversation that wasn't of any interest to him he would reply just simply with a "yes" or a "no".

Well, I did discover within the year or two that I had, in what turned out to be the very rewarding experience indeed of getting to know him fairly well, that one of the topics on which he could always be drawn was clean air; and it was in that way that my interest was first engaged in the work of his Committee and in the drive for cleaner air that has really had so many successes since the Beaver Committee of the early 1950s. And I must confess that looking back to those days and remembering my own attitudes at that time, I think I really believed that smog was absolutely inevitable; or started by believing that it was as inevitable as say, earthquakes or floods or any other natural disaster. So I am glad too, to have the opportunity of paying tribute to the work of the Society. The Society has been one of the leaders in the drive for a better environment in this country and, in fact, the improvement in the air of some of our cities must rank as one of the major environmental achievements of recent times. All of us who live and work in London are aware of the improvements of the past 15 years. It is now worthwhile to clean buildings; it is possible to hang washing on the line with a reasonable hope that it will remain clean. There are a variety of trees, plants and flowers to be found within the central area of London, which would never have flourished there 10 to 15 years ago. In fact, a recent survey within the square mile of the City of London showed that 200,000 plants a year were now growing in several hundred varieties, where 10 years ago only privet, laurel and plain trees survived. For its part in achieving these improvements all of us can, I believe, feel extremely grateful to the Society.



Mr Chataway addressing the Meeting

Now, in a sense the drive for cleaner air is the most fundamental of all the anti-pollution efforts. For the town dweller there is no escaping the polluted air with which he may be surrounded. Other efforts to improve the environment in towns must depend upon the effectiveness with which the battle is fought against smoke, dust, fumes, grit. With the best planners in the world, there can be little chance of providing wholesome and attractive surroundings unless you get clean air.

Looking at some of Manchester's problems the other day with members and officials of the Planning Committee, I had it impressed on me that the achieving of clean air there is a pre-requisite for all the other development plans of the City. The clearance of derelict land—and they have got a lot—the cleaning up of canals and rivers—and there are many in the Manchester area which need it—the planting of trees, the creation of attractive pedestrian precincts—and there are exciting plans for Manchester city—all of these things would only yield their full benefits if clean air is assured, and incidentally there in Manchester the point was made very forcibly to me, that while they pride themselves within the City on the action that they have taken to secure cleaner air, nonetheless, they still feel the ill effect of the inactivity of certain surrounding boroughs in dealing with the problem of polluted air.



Members of this Society will, I am sure, have welcomed the great concentration of interest that there has been in recent months upon the problems of the environment. It has really been remarkable, both here and in the United States that the media and the public seem suddenly and as never before to have been alerted to the threats to our environment. We have really been bombarded I think over the past year with advice and exhortations from press and from politicians, from television, from towns women's guilds, from almost everybody. A high proportion of this publicity focused upon the threats to human existence. We have heard from a good deal from what some have called the "eco-catastrophe" schools, and I am not sure that this publicity will prove in the long run to have been tremendously helpful. For one thing, there seems to be an enormous amount of scientific argument as to the reality of some of these threats, and it is by no means clear exactly how we are to go if it is air pollution that will finally do us in. There are some who foresee human extinction as a result of what is called the "greenhouse effect", that the build-up of carbon dioxide in the atmosphere will lead, in due course, to the melting of the ice caps and we shall all be drowned. But just as you are trying to fully envisage this situation with the temperatures rising, the seas coming up, the people making for the high ground in the hot steamy atmosphere, a totally different threat is portrayed before you and that is the "ice box effect". This, it is suggested, will be brought about by the build-up of particulate matter in the atmosphere: dust and grit which will freeze out the life giving warmth of the sun with the result that the human race will be extinguished, not by heat or by flood, but by cold. And then a third choice has been offered in a large number of the programmes and articles over the past year; and that is asphyxiation. It having been suggested that we are paving over so much of the oxygen producing carbon dioxide absorbing greenery or else interfering with the alga plankton cycles, so that in due course asphyxiation must be our lot.

Well, obviously I am in no position to dismiss all or any of these threats. I am bound to say, however, that as a layman, on the evidence that is so far presented, they do not seem to me as real as the well established threats to human existence which we have, I think, been worrying about for some years—the prospect of nuclear war or of the population explosion. But clearly it is right that all these dangers, however remote they may seem, should be fully investigated.

I am concerned, however, that there should not be in the current spate of interest in environmental problems too much of a tendency to exaggerate; to pretend there is certainty where no certainty exists. Because if this happens, then I fear there may be a public reaction; that people may feel that they have been taken for a ride and public interest may pass on to something else. And in the meantime, these treats of doom do undoubtedly divert some interest from the less dramatic but surely extremely important tasks that face us in producing a pleasanter environment. Now, in the producing of that better environment the clean air campaign has, I believe, an enormous part to play and I want briefly in a few moments today to concentrate upon just three aspects of the problem which remain unresolved.

First of all the question of sulphur oxides. The Clean Air Act of 1956 did not deal with the gaseous constituents of chimney effluent like oxides of sulphur, except for a section that was intended to ensure that the heights of new chimneys, other than those of residences, shops and offices were sufficient to give adequate dispersion and dilution of the emissions in the atmosphere. Like an awful lot of other things connected with the environment, this sulphur question is complex, or at least it is complex to me. In the first place, the results of the National Survey, which were begun in the winter of 1961/2, show that emissions of sulphur dioxide have reached their peak and have now started to decrease in spite of increasing industrial activity. And fuel policy, with its plan for the next 10 years or so, is likely to lead to continuing decreases as North Sea gas and nuclear energy come into more widespread use.

Secondly, the exact nature of the environmental hazard that is posed by sulphur oxides is by no means clear. Reports appear in the newspapers from time to time about "the huge tonnage of sulphuric acid that is wafted from our tall power stations and industrial chimneys on to the land of our Continental neighbours—especially Sweden, and this is clearly something that we ought to monitor very closely. The air is as international as the sea; one nation's out-tray is another nation's in-tray and it is the part of good Europeans, if nothing else, to keep an eye on any untoward requests. The winds, so we are told, are not as prevailing as they used to be. One day our friends to the north may be able to return the compliment. Well, more immediately though the question is "Do the present, although apparently declining levels of sulphur dioxide in the air have harmful implications to health, and if so, what ought to be done about it?" I must confess to being a little sceptical about the traditional British approach to some of these medical issues.

Surrounded by distinguished scientists, I am hesitant about saying, as I intended, that scientific caution can be over done. But some authorities writing in this field do seem almost to make out a case that  $\text{SO}_2$ , CO, NO, or some a mixture of all three are positively beneficial to health. It does seem to me that we ought perhaps to err on the side of caution. The Royal College of Physicians has recently reported that chronic bronchitis is one of the major causes of disablement and death in Great Britain, particularly among middle-aged and elderly men. In 1967 it caused the death of over 5,000 men and over a 1,000 women between the ages of 45 and 64. It may well be true that the increasing mortality from bronchitis in man is more closely linked to increased cigarette smoking than to any exposure to air pollution, and I have no difficulty in believing that.

But in a sense that is cold comfort, and as a layman I am always disturbed about what the experts refer to as the synergistic effect. By this they mean, I think, that two sources of trouble taken together can present far more problems than the same sources considered separately. The combination of sulphur oxides with particulate matter, for example, appears to be quite significant as far as the poisonous effects of sulphur oxides on animals and on man are concerned. Well, I believe that the next Government must examine very, very carefully the whole issue of sulphur oxide control techniques. At the present time over 30% of sulphur dioxide emitted to the atmosphere in Britain is derived from fuel oils; virtually all the



rest comes from solid fuels, and some of the questions which need to be looked at are these I suggest: the availability of low sulphur fuels like natural gas, low sulphur fuel oils and low sulphur coal; secondly, desulphurisation including coal-cleaning techniques and catalytic treatment with hydrogen to remove sulphur from oil; thirdly, the removal of sulphur oxides from flue gases, particularly by means of the lime-stone dolomites injection process; and lastly, hastening the switch-over to alternative energy sources such as nuclear power.

Ultimately, of course, the sulphur oxide problem, like so many others, comes down to a question of choice and the willingness to pay. But I do not believe that just because there is some decline in the proportion of sulphur dioxide in the atmosphere—and it is as the White Paper has recently shown, a relatively small decline over the years—that we should lose interest in this problem or dismiss it as of no importance.

But a matter of more immediate concern, and indeed one, I think, in which there has been a very remarkable growth of interest throughout Europe and the United States, is pollution from vehicles. Last 22nd April was Earth Day celebrated in the United States on eight hundred college campuses and in 3,500 high schools; and this was the time of the great environmental teach-in. There were special awards presented to polluters; law student groups were organised to draft model anti-pollution suits, to develop courses on environmental law, large spot lights were shone at night on belching smoke stacks, dead fish were exhibited on the side-walks and there were students holding mass phone-ins to industrial polluters. And a place of honour in this great exhibition was reserved for the car. There were mock funerals on a number of American college campuses of the internal combustion engine, and a million button badges were distributed reading "kill the car". Crowds gathered around the G.M. building on Fifth Avenue and Central Park raising their fists and shouting various slogans. The interest in the anti-pollution drive, great as it is in this country, has not quite reached these heights; but in the United States there is undoubtedly a real determination, sometimes expressed in these excessive fashions, to try to curb the offensive pollution that results from the motor vehicle. And the American Government have, of course, taken quite drastic steps in this direction.

They began by regulating automobile emissions of carbon monoxide and hydrocarbons on the 1968 models. Standards for 1970 model cars have been made significantly tighter. This year, for the first time, emissions from new buses and heavy duty trucks have also been brought under Federal regulations. President Nixon said in the message to Congress on the 11th February that emission levels can and must be brought much lower. He announced that the Secretary of Health Education and Welfare was publishing considerably more stringent motor vehicle standards for '73 and '75 models, including control of the nitrogen oxides by '73 and particulate emissions by '75.

Well now, what are the implications of these new standards for motor vehicle manufacturers over the rest of the western world? It is a very difficult question to answer. In the first place, even in the United States, the situation is fairly confused. I think that we have been witnessing over

this past year a kind of leap-frogging race as it seems between the Federal Government and the California State Government. Each side appears to keep on upping the ante and it is by no means clear what the final score will be. The situation is further complicated by the fact that what appears to be the same standard can, in fact, be defined in very different ways according to the method of testing which is selected. Whether the car is asked to perform, for example, 5 cycles from cold—and the cycle itself for different periods of acceleration, deceleration, idling and so on, varies between the Federal Government and California and Europe. Or seven cycles when warm—and that is a considerable result on the effect of the test result.

But what does appear to be reasonably certain, as I understand it, is for cars to meet the 1975 standards, relatively major modifications are going to be required. There is the positive crank case ventilation system, which is designed to remove unburnt gasoline from the crank case: the controlled combustion system for mixing air and fuel and modifying ignition timing: evaporative emission control involving pipes between the carburettor and the fuel tank and a carbon canister to store fuels: transmission control systems to retard spark timing to control nitrogen oxides and hydrocarbons. All these may have been adequate for the 1968 standards. They may even be adequate for the 1973; and certainly between them they appear to reduce 80 per cent of hydrocarbons and 66 per cent of carbon monoxide emissions. But something more is going to be required if the 1975 standards in the United States are to be met and the two principal means that are probably being considered at present are first reactors, some form of after-burner to consume exhaust gases, and a catalyst muffler a device that will oxidise unburnt fumes. There is no doubt that introducing reactors or catalyst mufflers will add significantly, perhaps as much as £50, to the price of the car. But that is not the end of the story. The functioning of these devices is destroyed or impaired by the presence of lead in fuel. Lead, as we all know, was introduced into fuel in the 1920s as an anti-knock compound, as a cheap way of raising the octane rating of fuels. The oil companies can produce unleaded fuels to suit the present high octane engines, but the development of a full range of nonlead high octane fuels will require several years. The likelihood is that these fuels will also be more expensive; 2d. a gallon more has been suggested. An alternative approach is to lower the compression ratio of cars to enable them to run on unleaded petrol. Ford and General Motors have announced that they will do this on next year's model. Presumably once lead-free high octane petrols are widely available, compression ratios will go back up again to meet the inevitable market demand for high performance cars.

Well now, one recognises that there are particular circumstances in the United States which are not necessarily duplicated here or anywhere else. In Western America there is the peculiar geophysical situation of Los Angeles which has produced the notorious photo-chemical smog; and it appears that the experience of Los Angeles has had a tremendous effect upon California and that California has had effect upon the legislation adopted in the United States. There is obviously no overriding reason why even in the long term, we or Western Europe should adopt exactly the same standards as those in the United States. But it does seem that we in this



country will very shortly have to make up our minds about the standards that we do intend to adopt.

The recent Government White Paper does not go very far towards resolving these problems. No action, for example, is taken, it is suggested, on carbon monoxide. The dangers of carbon monoxide are, I realise, a matter of controversy. The report of the Royal College of Physicians, to which I have already referred, states that concentrations of carbon monoxide in blood of persons in streets with heavy traffic is often exceeded in cigarettes smokers not exposed to motor exhausts. They do suggest, though, that exposure to carbon monoxide in street air may affect the senses and further research should be carried out on the effects of small concentrations. The Medical Research Council's Air Pollution Unit at St. Bartholomew's Hospital takes a similarly cautious approach. But there was fairly recently the research, I know it has been questioned, carried out for the Consumer Association at Brighton, which suggested that carbon monoxide levels can have a quite significant effect on reducing concentration and thereby in causing accidents.

But in the Government's White Paper it is acknowledged, and I think absolutely rightly, in the concluding paragraphs, that anti-pollution measures should not be directed solely towards health hazards. It really is not sufficient to say of carbon monoxide emissions from motor vehicles that it is not a proved health hazard. What is clear is that many of the smells and emissions from the motor car are more and more resented by the public and that there is a growing demand that in this area, too, we should take further steps to secure clean air.

I believe, therefore, that what will be necessary, and necessary fairly soon, is here in Britain for it to be made clear whether we are intending to go for American standards or whether we are intending to go for the European standards that have been laid down by the E.E.C. At any rate, we should fix, and fairly soon, defined targets to be reached within certain dates. This, it seems to me, is of importance, too, for the motor industry and for the oil industry, because obviously very large investments depend upon the decisions that are taken and continuing uncertainty cannot be welcome to either of them. But the third source of air pollution to which I want to refer today and which is in many ways the most important of all, is the pollution of the air by particulate matter—by grit and dust; the air pollution that was covered by the 1956 Act. And it is sad indeed that the clean air programme should have been so seriously undermined by the shortage of solid smokeless fuel, and I believe that this is a shortage that should never have been allowed to develop.

Ten years ago it was clear that town gas would be produced to an increasing extent from oil rather than coal. Six years ago it was clear that there would be a switch over to natural gas. And, as Lord Robens has said, it appears here to have been a case of the Government's left hand being apparently unaware of the activities of its right. In May alone, and it has after all been one of the warmest Mays on record, no less than another six local authorities have had their smoke control orders suspended. That means that in this year alone 26 smoke control orders have been suspended. The National Coal Board say that there is likely to be a shortfall of some 700,000 tons of solid smokeless fuel next winter. It is pretty





A few of the audience

clear from the coal distribution trade that supplies in this coming winter are certain to be a good deal worse than in the winter past.

Now, I feel that the moral to be drawn from this particular failure, which has been a failure of some importance for the whole clean air programme, is that the time has come when in all these fields concerned with the environment, the Government should set definite targets and target dates. It should define its aims and say by what period what is to be achieved. This, after all, is the procedure that is followed in most other spheres in which Government activity is important. We have targets for the building of houses, for the reduction of class sizes in schools although we do not always reach them—and it would be an entirely inappropriate occasion, this, for me to dwell on that in any way. But if you have targets, it then becomes clear to those interested whether or not we, as a society, are meeting our aims.

I believe that what is now needed in the whole field of the environment, is to move the issue off the level of generalised speech-making to the point where we have defined aims, agreed targets and agreed target dates. And if, in the field of clean air we had set target dates, well, perhaps Government would have taken action earlier on to ensure that the supplies of solid smokeless fuel required to carry that campaign through were available. What is now needed for solid smokeless fuels is, I believe, a drive to increase supplies. Even so, there is no disguising the difficulties that are bound to occur next winter.

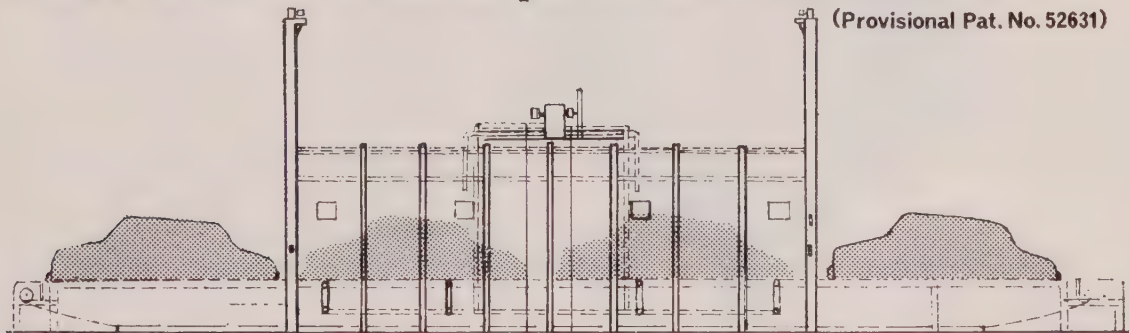


There must be better co-ordination between the Ministry of Technology and the Ministry of Housing and Local Government. Some steps, I think, could be taken in the continuing period of shortage to concentrate solid smokeless fuel supplies where there is no reasonable alternative; and over the longer period we must make renewed efforts to convert to other forms of smokeless fuel—gas, oil, electricity. Only with a new sense of urgency can the clean air programme be advanced. Once the short term crisis is overcome, then recalcitrant authorities must be given dates by which they will be expected to introduce clean air measures, and the country should look forward to the completion all over the country of a programme which has already brought very, very considerable benefits.

I hope, Mr. President, that the nineteen seventies will be looked back upon as a decade in which we, in this country, made very substantial progress in the improvement of our environment. I think there is no doubt that there is in this country a growing desire for a cleaner, pleasanter Britain. I have no doubt that Government has an important role to play; that local government has an important role to play; that there is a vital part for local amenity societies and for national bodies such as your own. As I have tried to stress, I believe that cleaner air is basic to the achievement of the better environment that we all want to see. So I hope, Mr. President, that you and your Society will continue to campaign, will continue to exert your influence on Governments of any and every colour; and that you will see by the end of the nineteen seventies that cleaner air for which you have campaigned so much for over the years.

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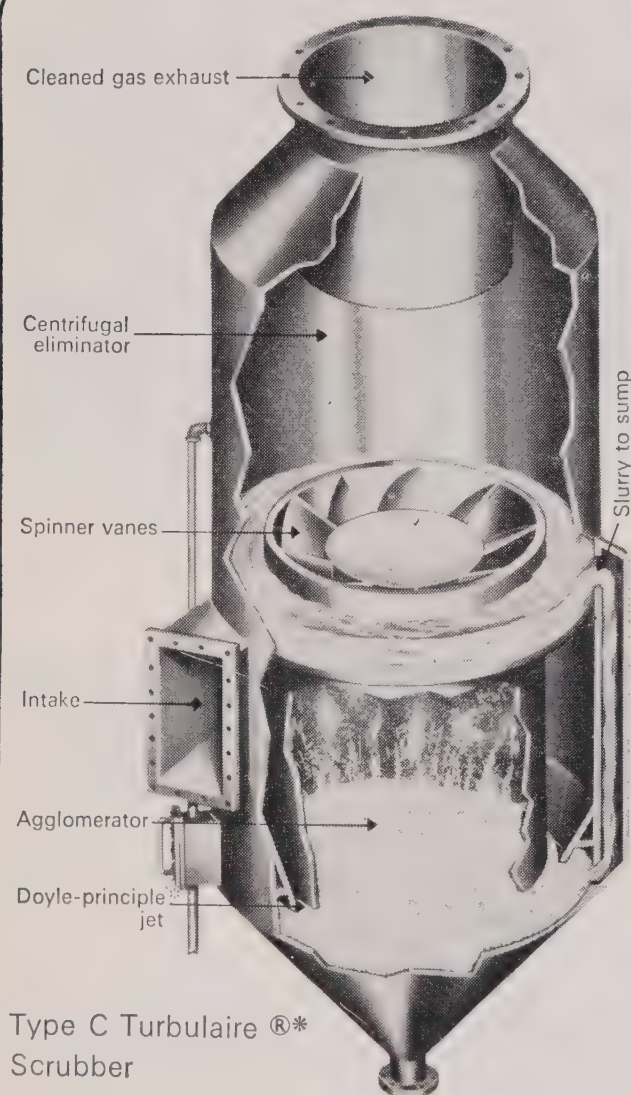
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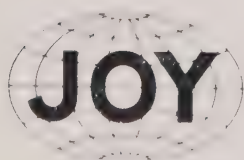
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# Clean Air—Are we going about it in the right way?

By R. Moffatt, A.M.I.S.E., of Pearson Panke Ltd

From recent press reports it would appear that "Pollution" is going to be just one of the points on which the next General Election is going to be fought. Over the coming months every voter is likely to hear M.P.'s talking about cleaning up Britain. The purpose of this article is to look at our own CLEAN AIR ACT and to examine the "back-up" given to it by various bodies. To compare these with their German equivalents and to look at an instrument which has been approved under the German scheme.

The CLEAN AIR ACT of 1956 was designed to make the air of our industrial cities a little more wholesome. The ACT begins by stating (Section 1(1)) "Subject to the provision of this ACT, dark smoke shall not be emitted from a chimney of any building, and if, on any day, dark smoke is so emitted the occupier of the building shall be guilty of an offence. The term "Dark Smoke" is qualified in section 34(2) of the act as being "Smoke which, if compared in the appropriate manner with a chart of the type known at the date of the passing of this ACT as the Ringelmann Chart, would appear to be as dark or darker than shade 2 of the chart". The ACT also states that under certain circumstances the Minister shall be able to "impose requirements" as to providing equipment to monitor the density of smoke emitted from any furnace.

The usual type of equipment provided for this purpose works on a photo-electric principle. British Standard 2811, issued in 1957 describes the theory of such instruments and lays down the minimum requirements which must be met if the equipment is to be able to carry the seal of the British Standards Institution.

In 1966, ten years after the introduction of our own ACT, in the Nordrhein-Westfalen area of Germany clean air legislation was also introduced. The German legislators adopted a somewhat different approach from that of their British counterparts. Instead of opting for a system based on Ringelmann charts i.e. on the colour of the smoke emerging they decided that they would call for a system based on given levels of obscuration in the chimney. These levels would be measured photo-electrically by an "on-line" system i.e. monitoring would be continuous. Because of the dependence of the law on the measuring systems employed the legislators decided that a series of tests should be carried out in order that the long term reliability of proprietary equipment could be assessed, and that only instruments which demonstrated that they could meet the conditions of the test, should be used on installations within the Nordrhein-Westfalen area.

## Testing

Instructions were issued to the "Arbeits und Sozialministeriums", the equivalent of our Department of Employment and Productivity, to devise and conduct the tests. The tests were to be conducted over the period from March 1968 to August 1968, and the findings were made public.

Four companies submitted instruments to be tested. Two instruments of each type were mounted on a chimney and subjected to the series of tests. The tests were designed to cover the following ten points.

- (1) *Environmental Conditions*: The instruments ability to stand up to the extreme climatic conditions which would be likely to be met.
- (2) *Correlation*: The ease with which the results indicated by the instruments could be related to the actual density of the smoke.
- (3) *Scaling*: The ease with which the results could be read.
- (4) *Sensitivity*: The range of obscuration densities over which the instrument would give reliable results.
- (5) *Zero Check*: Ease of accurately setting and checking the 100% Transmission point (i.e. Optical Density = 0).
- (6) *Alarm Setting*: The degree of difficulty involved in setting the alarm point.
- (7) *Alarm Stability*: The long term stability of the alarm switching threshold.
- (8) *Zero Stability*: The long term stability of the 100% Transmission setting.
- (9) *Filtration*: An assessment of the cleanliness of the air used to keep optical surfaces clean.
- (10) *Resistance to Dirt*: The efficiency with which the air-flushing system prevented the build-up of dirt on the optical surfaces.

The equipment would be assessed as to how it dealt with each of the above tests and the result would be classed as either satisfactory, partially satisfactory, or unsatisfactory. The tabulated results are shown in Fig. 1.

Clean Air Conference

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**Figure 1. Tabulated Results.**

<i>Section</i>	<i>Company a</i>	<i>Company b</i>	<i>Sick—RM3g</i>	<i>Company c</i>
Environmental conditions	SATISFACTORY			
Correlation	PARTIALLY SATISFACTORY			
Scaling	partially satisfactory	SATISFACTORY		
Sensitivity	SATISFACTORY			unsatisfactory
Zero Check	SATISFACTORY			
Alarm Setting	partially satisfactory	satisfactory		partially satisfactory
Alarm Stability	satisfactory	unsatisfactory	satisfactory	unsatisfactory
Zero Stability	satisfactory	unsatisfactory	satisfactory	unsatisfactory
Filtration	partially satisfactory		satisfactory	partially satisfactory
Resistance to Dirt	partially satisfactory			satisfactory

The above table shows that the overall performance of the monitor type RM3g manufactured by Messrs. Sick Optik Electronik of Munich was better than any of the other instruments. The only point on which the system was any worse than its competitors was point 10—"Resistance to Dirt". Close examination of the results showed that over the six month period the drift due to dirt build-up was 3% of F.S.D. When the optical surfaces were cleaned the instrument returned to its normal initial accuracy of 1%. The examiners concluded that providing that the instrument was cleaned at 3 monthly intervals the inaccuracies caused by the build-up of dirt could be ignored.

In August 1968, after the results had been published the "Arbeits und Sozialministeriums" gave permission for the RM3g to be used on installations in the Nordrhein-Westfalen area. The instrument from Sick Optik Electronik was the first instrument to gain this approval, but the author must point out that he does not know if any of the other instruments have gained approval since this time.

*The Sick Optik Electronic Monitor, type RM3g*  
*Optical System*

The optical system of the RM3g is shown in figure 2.

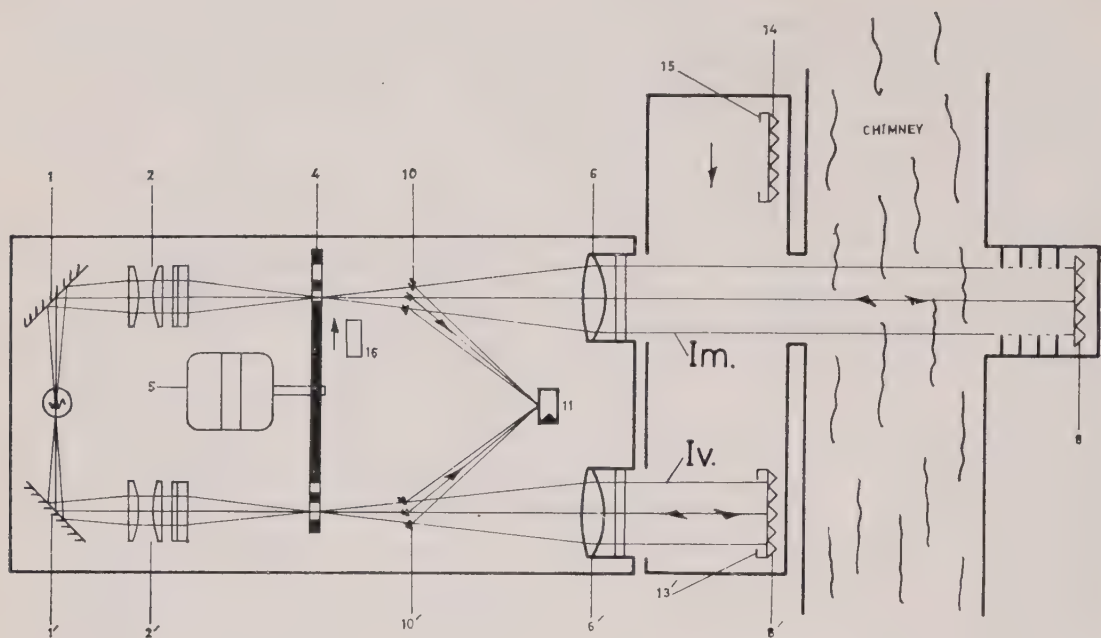


Fig.2. Optical system

Symmetrically arranged sets of plane mirrors 1,1' and condenser lenses 2,2' produce two images of the lamp filament on the level of the modulating disk 4. A front elevation of which is shown in figure 3.

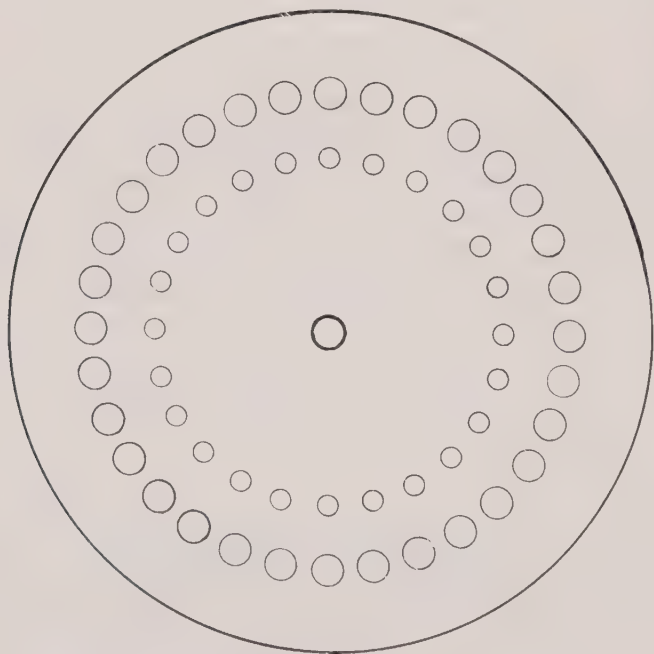


Fig.3. Modulating disc



The two images are at different pitches from the centre of the modulating disc, as are the two sets of holes. The synchronous motor 5 causes the modulating disc to revolve. The effect of this is to produce two light beams modulated at different frequencies. The comparison light beam Iv passes via the lens 6' and falls upon the reflector 8'. The measuring light beam Im passes through the lens 6 and crosses the chimney (distance Mx) and is thrown back on itself by the measuring reflector 8. The two light beams return to the optical head and are partially reflected from the semi-transparent mirrors 10,10' and fall on to the photo-sensitive element 11. Assuming that the chimney is free from smoke then the air in the chimney will have the same optical density per unit length as that within the optical head. Since the measuring beam has travelled further than the comparison beam it will normally be weaker than the comparison beam. By adjusting the diaphragm 13' on the comparison reflector we can, however, make the two beams have the same intensity. A check reflector 14 which has been adjusted by means of the diaphragm 15 can be swung into the path of the measuring beam to simulate the "Zero Obscuration Density" condition. This is normally checked at half hourly intervals, automatically under the control of a timing switch. A neutral filter 16 can also be swung into the path of the measuring beam to produce a further calibration check.

*Electronic Evaluation:* A block diagram of the system is shown in Fig. 4.

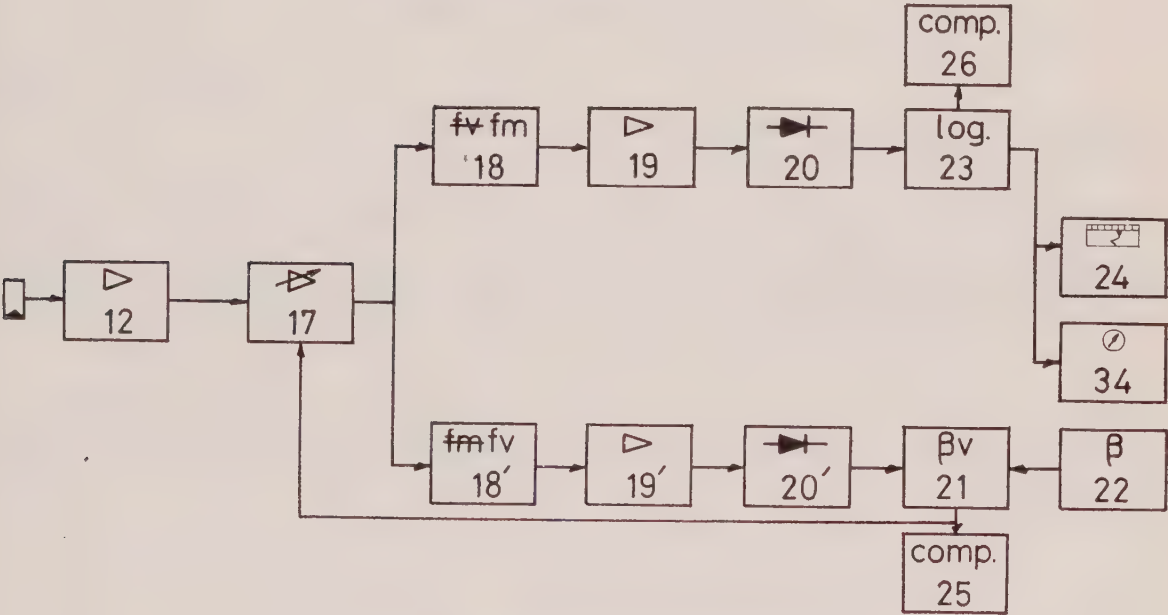


Fig.4.Simplified block diagram

The light falling on the photo-sensitive element will cause a signal, proportional to the amount of light falling upon it, to be generated. Since we have two light beams of different frequencies the output of the photo-sensitive element will be a complex waveform caused by the intermodulation of the measuring and comparison beams. This complex waveform is amplified by the pre-amplifier 12. The output of the pre-amplifier is then fed to the regulating amplifier 17. The regulating amplifier is a variable gain amplifier having very heavy negative feedback applied to it. This type of system ensures that drift or inaccuracies due to temperature, mains voltage fluctuation, and ageing of the lamp are cancelled out. After the regulating amplifier the two signals are separated by the bandpass filters 18,18'. The signals are amplified by the matched amplifiers 19,19' and then rectified by the rectifiers 20,20'. The D.C. output of the rectifier in the measuring channel is then applied to the Logarithmic network 23, the output of which is then displayed as the "Obscuration Density" in the chimney, and is also taken to the input smoke comparator 26. The output of the comparison channel is taken to another feed-back amplifier 21 and to the comparator 25 where it is compared with a pre-set signal. If the comparison signal does not approximate to the pre-set level a further alarm, indicating a fault in the instrument, will be initiated.

#### *Output and Interpretation:*

The output of the RM3g is expressed in terms of Extinction, this corresponds to the term Obscuration Density and is expressed as

$$Dx = \log_{10} \frac{I_{mo}}{I_{mx}}$$

where Dx is the Obscuration Density

$I_{mo}$  is the intensity of the light before passing through a thickness x of smoke,  
and  $I_{mx}$  is the intensity of the light after passing through a thickness x of smoke,

An alternative form of output is available where the amount of smoke in the chimney is expressed as percentage Transmission (Obscuration) and can be expressed as

$$Tx = \frac{I_{mx}}{I_{mo}} \times 100$$

where Tx is the Obscuration

$I_{mo}$  is the intensity of the light before passing through a thickness x of smoke.  
and  $I_{mx}$  is the intensity of the light after passing through a thickness x of smoke.



### *System Improvements*

The results shown in this text were obtained with a Sick Optik Elektronik Smoke Monitor, type RM3g. Despite its obvious success, and in order to obviate the point which were regarded as only partially satisfactory, Messrs. Sick have now produced an improved monitor, type RM4. While retaining the basic principles of the RM3g the RM4 has an improved optical system which ensures even greater accuracy. A batch of 23 instruments employing the same optical system as the RM4 were required to measure the obscuration density of fogs and mists. These instruments were specially adjusted to give maximum accuracy, the resultant accuracy was in the order of 0.3%. The RM4 also incorporates an improved system for keeping the optical surfaces free of dirt.

### *Conclusion*

Pioneering work by the British Government and the British Standards Institution has pointed the way for countries like Germany and has given them the opportunity to profit from our errors. Their version of the CLEAN AIR ACT is ten years younger than ours. They would appear to have a system which uses a measuring technique which makes the law easier to enforce. Perhaps it is time that we should look at the systems that have been introduced since 1956 and see if we can now profit in turn from the work that has been done in other countries.

---

## **OBITUARIES**

### **Mr. F. V. Magness**

We regret to announce the death of F. V. Magness, Chairman for some years of the West Midlands Division of the Society. Mr. Magness was a member of the Maud Committee, the Clean Air Council and the Regional Economic Council. Elected to Willenhall Council in 1954, he later served for two years on the Council of the enlarged County Borough of Walsall. In 1964 he received a C.B.E. for services to Local Government. We would like to express to Mrs. Magness the sympathy of all in the Society.

### **Miss Nell Kenyon**

We regret to announce the sudden death of Miss Nell Kenyon on 3rd August, 1970. Last year Miss Kenyon was Chairman of the North West Division of the Society and this year was a member of the Executive Council and of the General Purposes and Finance Committee. She had long been interested in the cause of clean air and in her time did much to promote it, especially in Manchester and the north west. At the time of her death she was Chairman of the Manchester Branch of the Electrical Association for Women and was a member of the Executive Committee of the Association.

Her circle of friends was wide. It could be said that "Nell Kenyon knew everybody, and everybody knew Nell". She was adept at pouring oil on troubled waters and smoothing ruffled feathers, and could always be relied upon to speak with commonsense and sincerity at a time when this was needed most. She will be greatly missed.

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# SOLID SMOKELESS FUEL

## Question and Answer in the House of Commons

Wednesday, 22nd July, 1970

**MR. EDWARD GARDNER** (South Fylde): To ask the Minister of Technology, if he will now make a further statement on the steps he is taking to avert a shortage of solid fuel especially in the North-West; and what restrictions he will impose on the export of hard coke to the Continent in order to ensure that the home market is adequately supplied during the coming winter.

**MR. PETER REES** (Dover): To ask the Minister of Technology, if he will make a further statement about supplies of solid smokeless fuel.

**MR. TOM PENDRY** (Stalybridge and Hyde): To ask the Minister of Technology, when he will make a further statement on availability of adequate supplies of smokeless fuel this coming winter, with particular reference to the North-West.

**MR. RON LEWIS** (Carlisle): To ask the Minister of Technology, if he is aware of the difficulties being experienced by householders in rural areas in obtaining supplies of coke and other kinds of solid fuels; and what steps he intends to take to relieve the situation.

### **SIR JOHN EDEN**

Last winter there were local shortages of solid smokeless fuel, and for some time it has been clear to most people that there are also likely to be difficulties this coming winter.

It is not possible to give precise estimates of the size of any shortfall as this depends upon a number of factors, such as the degree to which consumers turn to other fuels, and the weather conditions.

On the basis of the forecasts of the National Coal Board and other producers, supplies to the non-industrial market are unlikely to exceed 10m. tons. The trade believe that demand will exceed this figure.

To deal with this situation and to have fullest regard to a progressive clean air policy, the Government have taken the following steps:

(i) Government Departments are converting as many as possible of their coke-burning appliances to other smokeless fuels;

(ii) Local authorities, hospital boards and other public bodies have been asked to do the same.

These two measures combined should reduce demand by up to  $\frac{1}{2}$ m. tons;

(iii) All producers have been urged to keep their plant working to maximum capacity;

(iv) The NCB have made arrangements to import up to 75,000 tons of briquettes from France;

(v) I understand from the producers they are restricting exports of fuel suitable for non-industrial use to the minimum consistent with contractual obligations;

(vi) The trade have assured me that they will distribute available supplies as helpfully as possible;

(vii) The gas industry have undertaken to produce from uneconomic plant 170,000 tons more coke than they would have done. The cost of this will be met in part by a price increase from 1st August not exceeding £3 per ton. The balance will be financed as to one-third by the gas boards concerned and two-thirds by the Government. The cost to public funds is estimated to be £300,000 and will be related to production in 1970/71 only. A supplementary estimate will be submitted to the House in due course. If expenditure becomes necessary before the supplementary estimate has been approved by Parliament, recourse will be made to the Civil Contingencies' Fund.

At this late stage, there is little prospect of further increasing supplies for this winter and we must therefore be prepared for local shortages.

In view of this my Rt. Hon. Friends the Minister of Housing and Local Government and the Secretary of State for Wales are issuing a circular asking local authorities with smoke control areas to check immediately the probable supply position of solid smokeless fuels in their areas. My Rt. Hon. Friend, the Secretary of State for Scotland, is considering whether a similar circular is required in Scotland. Where supplies cannot be assured, the Minister will grant temporary suspension of smoke control orders.

The Government greatly regret the necessity for these precautionary measures, but they are necessary to reduce hardship this coming winter. Provided plans to increase output come to fruition, the situation should get progressively easier by 1971/72 and subsequent years. The Government are determined to resume progress towards cleaner air as soon as possible.

### **Authorities urged—plan now for possible solid smokeless fuel shortage this winter**

Mr. Peter Walker, Minister of Housing and Local Government, has asked local authorities with operative smoke control orders to make an early assessment of local solid smokeless fuel supply prospects and, if they think suspension is going to be necessary, to prepare their policy and be ready to put it into operation at the first sign of need and before hardship develops among residents.

This advice is based on the possibility of shortages of solid smokeless fuel in some parts of the country in the coming winter.

Local authorities are told in a Circular that the Minister intends to be ready to make suspension orders, applicable to particular smoke control areas or to groups of areas, in the light of requests from individual authorities, "who will be the best judges of local circumstances and needs", and that suspension orders can be made and brought into operation quickly—if necessary in a matter of days.

Authorities are advised that if they have not already done so, they should consult at once with their Regional Office of the Solid Smokeless Fuels Federation, consider carefully the Federation's advice about prospects for this winter and, in the light of that advice, formulate their policy without delay. This policy should extend not only to possible suspension, if this should prove unavoidable, of one or more smoke control orders already in operation, but also to the question of whether postponement may be necessary of the operative dates of any smoke control orders recently confirmed but not yet brought into operation.



The Circular refers to problems which may arise over the burning of coal in some types of appliance and states that coal merchants will be supplied with leaflets explaining to customers the circumstances in which they should seek advice. It also assures local authorities that every effort is being made to increase the availability of solid smokeless fuel to the domestic market and to distribute available supplies as helpfully as possible. It states: "The position is likely to improve during 1971 and the producers' plans to increase output should result in the restoration of a balance between supply and demand by the spring of 1972".

---

## **Coalite and Chemical Products Limited**

Statement by the chairman to shareholders

on Wednesday 29th July 1970

"You will, I know, expect me to give you up-to-date information about the proposal to build a new 'Coalite' Works at Rossington Colliery, near Doncaster.

"As you may have read in the Press, the result of the Public Inquiry was in our favour and the Minister of Housing and Local Government has authorised the scheme apart from a technical refusal in the case of the stocking ground. A new scheme for an alternative and improved stocking ground has been prepared with the co-operation of the National Coal Board and has been discussed with the Planning Authorities.

It has been necessary completely to re-appraise the scheme in the light of the changes that have taken place since our application for planning permission was originally made in March, 1969. After considering the matter in every possible detail at a special meeting on Monday of this week your Board has decided to proceed immediately certain outstanding points have been finalised. It is hoped that work will start by not later than the middle of September and, as a result of complete reprogramming, that the first few batteries of retorts will be in operation by the early days of 1972, the others to follow at intervals with completion by about the end of May that year. By that time, the output of domestic 'Coalite' will be approaching an annual rate of 2 million tons, an increase of 48% when compared with the present position. Work on the extension of the Works at Grimethorpe is ahead of schedule and the first six of the twelve new Batteries of retorts should be operating by the end of 1970."

The extension of the Grimethorpe Works provides for an annual increase in output of domestic 'Coalite' of 240,000 tons with completion by the end of April, 1971. In the case of Rossington, the annual output of domestic 'Coalite' will be at the rate of 420,000 tons with completion by the end of May, 1972. This total increase in the output of domestic 'Coalite' of 660,000 tons per annum, together with the increases that will be forthcoming from other producers, should ensure complete alleviation of the position within a reasonable period of time.

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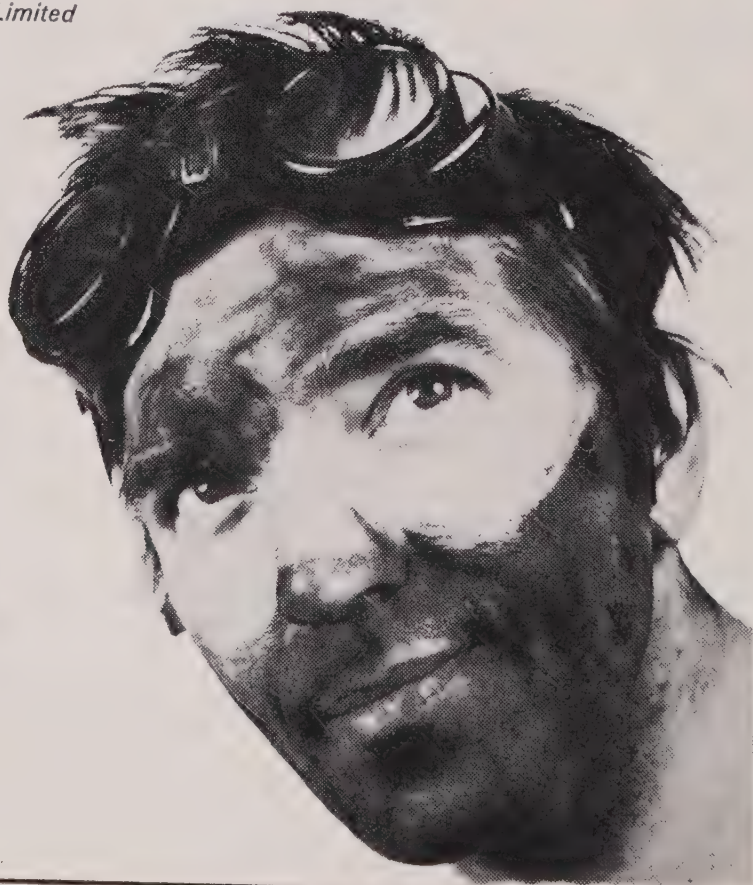
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# Smokeless Westminster

*Address by Mr. Eldon Griffiths, M.P., Joint Parliamentary Secretary, the Ministry of Housing and Local Government, at the Reception at Westminster City Hall, on 30 June, 1970.*

It was with very real pleasure that I learned that one of my first engagements as a Joint Parliamentary Secretary of the Ministry of Housing and Local Government would be to attend this reception. I feel a great deal of enthusiasm for the whole subject of clean air, and it is particularly gratifying to see what a change there has been in London air over the last decade. I know that the City of Westminster have been in the forefront of this particular battle and I should like to congratulate you warmly on the completion of your smoke control programme. Westminster, St. Marylebone and Paddington were among the earliest local authorities to make smoke control orders: now, Westminster are among the first whose area is wholly subject to such control.

A great many people have shared in this achievement, but I should like to mention two in particular. The first is your Chief Public Health Inspector, Mr. Pike, together with his staff. They have carried out the formidable task of preparing no less than 39 smoke control orders and ensuring that about 120,000 premises comply with the statutory requirements.

Your Town Clerk, Mr. Dawtry, has also been closely concerned with the whole campaign. His wide knowledge of the problems of clean air is well known, and while I am mentioning him, I should like to thank him for being such an invaluable member of the Clean Air Council.

London has made greater progress in eliminating smoke than any other region in the country. Over 70 per cent of the London Area and nearly 80 per cent of its premises are now covered by smoke control orders. Anyone who doubts the benefit of this ought to read the report of the Greater London Council's Research and Intelligence Unit. This shows that since 1968 there has been an 80 per cent reduction in smoke concentrations in Central London, while the duration of winter sunshine has increased by 50 per cent. The actual visibility has improved—it is now four miles on a clear day. Anyone ought to be able to see better times ahead with an improvement like that!

I am even told that you can now grow azaleas, camellias, rhododendrons, heather and many other pleasant things in places where once the smokey air would have killed them. Magpies, too, have returned to nest in Hyde Park, and the number of species of birds in London has doubled over the past 10 years. I hardly need to mention the improvement to Nelson's Column and the buildings around Trafalgar Square. They have been cleaned—with confidence—because we now know that thanks to the cleaner air, they aren't going to get dirty again in a matter of a few weeks. They will stay clean.

Above all, clean air has improved health. We all recall the great London smog of 1952. That smog caused 4,000 deaths. It came near to killing many more—people suffering from bronchitis and other chest complaints. In 1962, five years after the inception of smoke control in London, a similar but much lesser smog led to about 700 deaths. Since then, I am glad to say, London smog has not recurred.

Alongside this welcome progress, I must place a caveat. As many of you know, solid smokeless fuel was in short supply in some places last winter, involving a certain amount of suspension of smoke control. I am afraid that it is probable that we are going to be faced with even more severe shortages next winter, which, inevitably, will involve a rather larger number of local authorities in suspension. I regret this very much. I shall look hard to find out what went wrong and why. However, as far as the present government is concerned, everything possible is being done to maintain supplies.

Here local government has a big part to play in helping us to turn the corner and to alleviate hardship. Indeed, it is not too much to say that in many areas it may make all the difference to the domestic consumer, in terms of availability of coke this winter, if our hospitals, schools and public offices are able to achieve extensive conversions to other fuels—gas, oil, electricity or the smokeless burning of ordinary coal—of boilers at present running on coke.

I have every hope that the total result of these conversions, carried out between now and the onset of winter, in the spheres of responsibility of the local councils and of the health and education authorities, will result in a substantial quantity of extra coke becoming available to the domestic consumer.

Finally, I want to say one word about our general attitude to our physical environment and its conservation. This is something which the new Government, and the Prime Minister in particular, are deeply interested in and keenly concerned to protect. It is too early yet to say where we shall place our major emphasis, or how we shall deploy the limited resources available. But even at this early stage, I think it right to place on record that the need for clean air, for abundant and clean supplies of water, for cleaner beaches and national parks, will be among those aspects of the environment to which we shall attach great importance.

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# REVIEWS

## **106th Annual Report etc Works 1969.**

*The Chief Inspectors; 86 pages, H.M.S.O.*

As we have come to expect, this report is not only well worth reading but eminently readable.

The number of works registered under the Act at the end of 1969 was 1,691 involving the operation of 2,860 processes. The total number of visits and inspections made during the year was 9,563, and of this total, 430 were in connection with works not registered under the Act and 41 were concerned with radio active emissions. 2,018 quantitative analyses were made, and during the year the number of works concerned in specific complaints was 412. Of the 412 works, 330 were works registered under the Act and 82 were non-registered. Complaints against registered works were most numerous against metal recovery works, iron and steel works, electricity works, ceramics works, gas and coke works, aluminium works, sulphide works, cement works and copper works. Complaints investigated by the Inspectorate against non-registrable works were most numerous against mineral works.

Besides this mass of figures and information of this sort, the report takes the opportunity of putting into perspective some of the gloomy prophecies about pollution which have become fashionable in 1970 Conservation Year.

The "greenhouse" effect of carbon dioxide is discussed as is the possible dust belt formation which would cause a decrease in the earth's temperature. The report considers sulphur dioxide, an ever present problem but points out that although world wide 120 million tons of sulphur dioxide per annum are caused by man, some 600 million tons per year are produced by nature. The report continues that in 1963 to 1965, in this country, a peak of some 6.5 million tons emitted was reached. This has now reduced to a figure of 6.1 million tons and it is forecast that this figure will be down to 5.16 million tons by 1985. This is assuming that the sulphur content of fuels in use remains constant. It is pointed out, however, that the sulphur in residual fuel oil has, during the last few years, decreased from 3 per cent to 2.7 per cent and the signs are that this decrease will continue.

"The problems of air pollution are mainly economic," and this theme is discussed. The report continues "astronomical figures are frequently quoted for the costs of the effects of air pollution, but we see no rush by the alleged sufferers to finance the prevention of pollution at source, when on the face of it, there should be a phenomenal return for the outlay".

Cost benefit analysis would seem an answer, but this itself presents difficulties.

The British system of local and centralised control is examined and the report makes the point that though this may suit us it is not necessarily the system which would suit other countries. Here, pressures from the public have helped to raise standards and gain better enforcement of the law relating to clean air. "The National Society for Clean Air has been outstanding in this field of activity."

Though there can be justifiable pride in achievement, there is no room for complacency but rather a recognition of the task that lies ahead.

A very interesting portion of the report is that part which is devoted to the history of making ammonia and its compounds; this is extremely informative and well worth reading. Further on, the report contains a brief history of phosphorous making in this country and shows how the wheel has gone full cycle. This again is most fascinating. An interesting side light of what our fore-bears were prepared to do a hundred years ago is a story about what was then a locally famous 251 foot chimney. This chimney up to a height of 80 feet, was built in four sections. According to the book "The Story of 100 years of Phosphorus Making", published by Messrs. Albright and Wilson, "one advantage of the four sections was, so the story goes, that samples of flue gases could, if necessary, be taken for example by Alkali Inspectors, from a section not actually in use."

The report reviews the various industries under the control of the Alkali Inspectorate in some detail. It is not possible here to give consideration to all of these, but so far as crude steel production is concerned the report makes the point that the British Steel Corporation "has still to make up its mind about several difficult cases and meantime, at the works concerned, plant is being kept operating with the minimum of expenditure. This is unsatisfactory for air pollution control and for the local residents, most of whom have shown great restraint and patience."

In the section dealing with electricity works, an interesting side light on how one cannot consider clean air on its own is given in a reference to the Battersea Power Station. "The dry summer and autumn of 1969 reduced the flow of water in the Thames to a point where it was approaching deoxygenation. Troubles were being experienced with sewage treatment also, and ways were sought for alleviating the trouble. Some relief was obtained by our giving permission at the beginning of December (1969) to cease gas washing temporarily on Battersea "B" power station. Tests showed that the electrical precipitators were reducing grit and dust to below 0.2 grain per cubic foot and the waste gases were allowed to go to air hot and dry. As the "A" station relies on gas washing to remove grit and dust as well as sulphur dioxide, the same concession could not be granted to this section."

In comments on the difficulties of the cement industry, the report makes the point that air pollution can be affected by other conservation considerations. "So strong was opposition to the erection of a modern works in an area of natural beauty in the South-east, that the Company decided to defer the project indefinitely. From the purely air pollution viewpoint this was a pity because it means that production at the old works, which it would have replaced, will have to continue with out-dated equipment." Perhaps there is a lesson here for all connected with conservation.



In the report by the Chief Inspector for Scotland, a point is made about the international interest which has recently been shown in setting up effective air pollution control and Scotland, it has been found, has much experience, which extends back over a century to offer. The report continues "this last year of the 60's decade was perhaps most notable by a rapid upsurge of interest in controlling all aspects of environmental pollution, a field in which this Inspectorate covers to a large extent by our other work in the control of disposal of liquid and solid industrial wastes."

With regard to the production of electricity in Scotland, the report states that grit and dust emission remain as a recurring problem but what is described as "one break in the cloud", was very good control over dust which was found on measuring the emissions from burning pulverised coal at the new station at Cockenzie which is the first large coal fired station to be commissioned in Scotland since electricity generating stations came under the Alkali Act.

In the ceramics industry we frequently hear of complaints about the salt glazing of drainage pipes and it is therefore interesting to see specifically stated in the report that salt glazing of drainage pipes in Scotland caused no particular problems by fumes or smoke. "Dispersal of the discharges by high chimneys appeared satisfactory".

This is a book which anyone interested in clean air must buy, must read and keep on their shelves for constant reference.

#### **Cleaning our Environment. The Chemical Basis for Action.**

*A report by the Sub-Committee on Environmental Improvement, Committee on Chemistry and Public Affairs, American Chemical Society, Washington D.C. 1969, 249 pages \$2.75*

The report has two goals. First to present an objective account of the current status of the science and technology of environmental improvement, what is known and how it is being used, what must be learned, and how it might be used; and second, after analysis of the information so collected, to make recommendations. Accordingly the report opens with some 20 pages comprising 73 recommendations, 32 of which are concerned with clean air. Many of these deal specifically with the need to improve surveillance or measurement of pollutants and for the acceptance of enforceable standards. On the other hand, some other recommendations are rather vague.

The report then falls into four main sections, in which air, water, solid wastes and pesticides are discussed. Here we are mainly concerned with that section on the air environment, which runs to some sixty pages, and which opens with the words "It is not easy today to find a topic more likely than air pollution to generate vigorous debate and sometimes violent argument".

The various air pollutants:—sulphur dioxide, particulate matter, carbon monoxide, the oxides of nitrogen, hydrocarbons, lead and carbon dioxide—are discussed at some length. Under the heading "Controlling Air Pollution" consideration is given to "the mobile source of a number of air pollutants" provided by the 100 million gasoline powered vehicles on the road in the United States, and this makes interesting reading.

Generally, the problems are plainly stated as are their solutions. Equally, any gaps in knowledge are described, and the economics of pollution control are by no means neglected.

The report is provided with comprehensive references; it is perhaps unfortunate but only to be expected, that most of these are American sources.

The index is adequate.

This report might be described as a text book which sets out the problems and dangers of all forms of pollution with a proper sense of proportion and in true perspective. As such it will serve a very useful purpose.

### **The Electrical Association for Women—45th Annual Report.**

This report indicates that as the Electrical Association for Women moves into the 1970s it can record a year of promise in which long established work has continued to be actively promoted, new projects successfully launched and future plans formulated. The practical instruction provided by the Association has continued to expand and more attention has been focussed on the need to interest young people in electrical education.

The Association is still interested in running cookery courses for men and the public acquainted with the new international colour coding for domestic three core flexible cables, and the tea towel illustrating the new and old colours is still proving a best seller.

The Association is still interested in running cookery courses for men and these have continued to be received with enthusiasm.

The Association has participated in many exhibitions of varying character, but again emphasis has been placed, quite rightly in our view, on those with an educational flavour. Safety in the installation and use of electrical equipment has been a constant theme of all the Association's work and the Association has been only too pleased to be able to take a direct part in safety exhibitions in many parts of the United Kingdom.

### **Report of the Sheffield and District Clean Air Committee for the year ending 31 December, 1969.**

*Obtainable from Town Hall Chambers, 1 Barker's Pool, Sheffield 1.*

As ever this is an interesting report containing much useful information.

The report welcomes the extending use of natural gas by industry, and points out that many furnaces in the steel industry in Sheffield are now using this fuel.

In the past, the Committee have been very patient in dealing with the problem of fume arrestment from non ferrous melting plants. Their patience has now been rewarded in that firms carrying out the process have fitted or have on order fume arrestment plant which is satisfactory in minimizing pollution from this process.

The Committee has very close co-operation with the Alkali Inspectorate and also receives considerable help from the Department of Fuel Technology and Chemical Engineering of Sheffield University.



Smoke concentrations in the area covered by the Committee have once more shown a downward trend, but on the other hand sulphur dioxide has shown an increase over the year. The hope is expressed that perhaps the limit has now been reached and that the further use of sulphur free natural gas will help to bring about an improvement here.

**Environmental Pollution. Vol I No.1 July 1970.**

*An international journal published quarterly by Elsevier Publishing Company Limited, London. £6 10s. per year including postage.*

This is yet another new magazine dealing with the environment and pollution. The magazine is edited by Kenneth Mellanby and has an international editorial board. As the opening words in the first editorial state, this new journal has been started because its sponsors believe that there is a need for a scientific publication dealing with the biological effects of all types of pollution. And the contents of this first number would seem to bear this out. The first article is on polychlorinated biphenyls in wild birds in Britain and their avian toxicity.

What is more interesting to this Society is an article by F. Brian Pyatt of the Bromley College of Technology on "Lichens as Indicators of Air Pollution in a Steel Producing Town in South Wales". Another article by W. A. Feder of the University of Massachusetts deals with "Plant Response to Chronic Exposure of Low Levels of Oxidant Type Air Pollution".

This magazine is well produced with excellent diagrams and will no doubt fill a need for those concerned and interested in the subjects covered. Its intention is to publish mainly research papers containing original results.

We wish it every success.

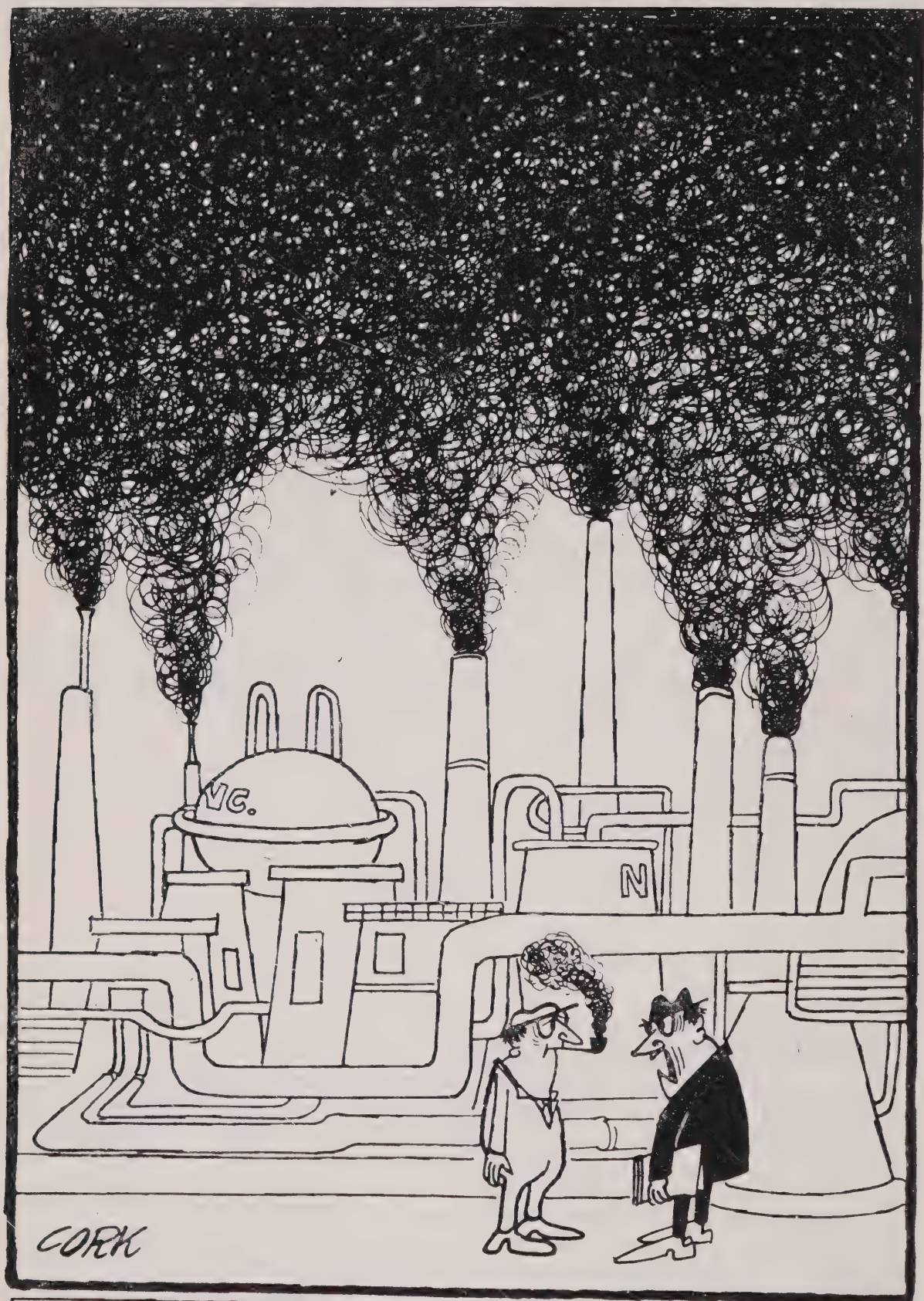
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## **Petrol Additive to Cut Pollution**

It was recently reported that a compound known as F-310 has been developed in the United States by Chevron Oil. This compound, when added to petrol reduces the level of carbon monoxide in exhaust fumes and also the level of unburnt hydrocarbons.

After extensive tests on European cars at laboratories in Rotterdam, it is claimed that a well used Renault, after 10,000 miles on petrol containing the additive, the percentage of carbon monoxide in the exhaust fumes dropped from 11.3 per cent to 8.5 per cent and unburnt hydrocarbons were more than halved.

This additive is now on sale from Chevron's 140 filling stations in this country.



AND DON'T LET ME SEE YOU AGAIN WITH THAT STINKING PIPE !!



# INTERNATIONAL NEWS

## EUROPEAN CONSERVATION YEAR

### Plans for managing the environment

Medium term plans for managing the environment following the European Conservation Conference have been sketched out by 40 Council of Europe experts from 17 countries.

Meeting at Strasbourg in the European Committee for the conservation of nature and natural resources the experts discussed a series of priority conservation steps, pending the adoption around 1972 of a long-term environment policy for Europe in the light of governmental reactions to the Conference's final Declaration.

The experts' plan which will be sent to Council of Europe governments for their comments covers three major areas:

1. *Conservation of the values of the environment*, which includes air, soil and water pollution, wildlife poisoning by pesticides etc., waste disposal and noise.

2. *Rational use and management of land in accordance with sound ecological principles*: this would group questions concerned with marginal agricultural and forest lands, abandoned and derelict areas, the management of water basins and coastal areas, natural reserves, recreational areas and "second home" development areas.

3. *Education and Information*

Among the practical studies under way in the Council of Europe are a scheme for introducing nature conservation into school curricula, a legal instrument on the protection of international fresh waters, measures to fight the regression of natural habitats for wildlife, a "red book" on birds threatened with extinction, and a manual on environment management for local government administrators.

## WEST GERMANY

### Air Pollution in Health Resorts

*by Dr. rer. nat. Kurt Gräfe, Hamburg*

Neuwirth (1) has suggested a means of controlling the air quality in health resorts by regulating the sedimented dust, and the author (2) was subsequently asked by the German Association of Health Resorts to give a paper on the gaseous pollution in such places. On the assumption that the air pollution in other resorts is similar to that of those in Germany, the request for a shortened version of (2) is welcomed.

Several sources of emissions should be watched and diminished in health resorts, e.g.:

*Motor cars:* The centres of health resorts should be barred for motor traffic. The exhaust gases of collecting garages should be led into the open air in such a way that nobody will be troubled. "Airing" should not depend on time but should be automatically regulated by a CO-warning-device.

*Restaurants:* Smoke and smells whether escaping through windows and chimneys or emitted by ventilators should not be noticeable to pedestrians and by people living above such places.

*Domestic sources:* The exhaust gases from domestic sources should be emitted at such a height that neither pedestrians nor the inhabitants of higher buildings in the surrounding area will be offended. Therefore the flue gases should leave the chimneys in the free air-stream. New buildings should receive their energy from central or district heating installations (3); their chimneys should meet the demands of the memorandum on chimney heights (4).

*Industrial plants and public property* (administration buildings, schools, swimming baths with warm water etc.): The height of most chimneys of such plants will be calculated according to the memorandum (4).

If the memorandum is not applicable the authorities in health resorts should take care about the height of the chimneys. And even if it is applicable, the surroundings (e.g. narrow valley, near tall buildings) in resorts should be given special consideration. Otherwise a  $\text{SO}_2$ -record as shown in Fig. 1 should be kept.

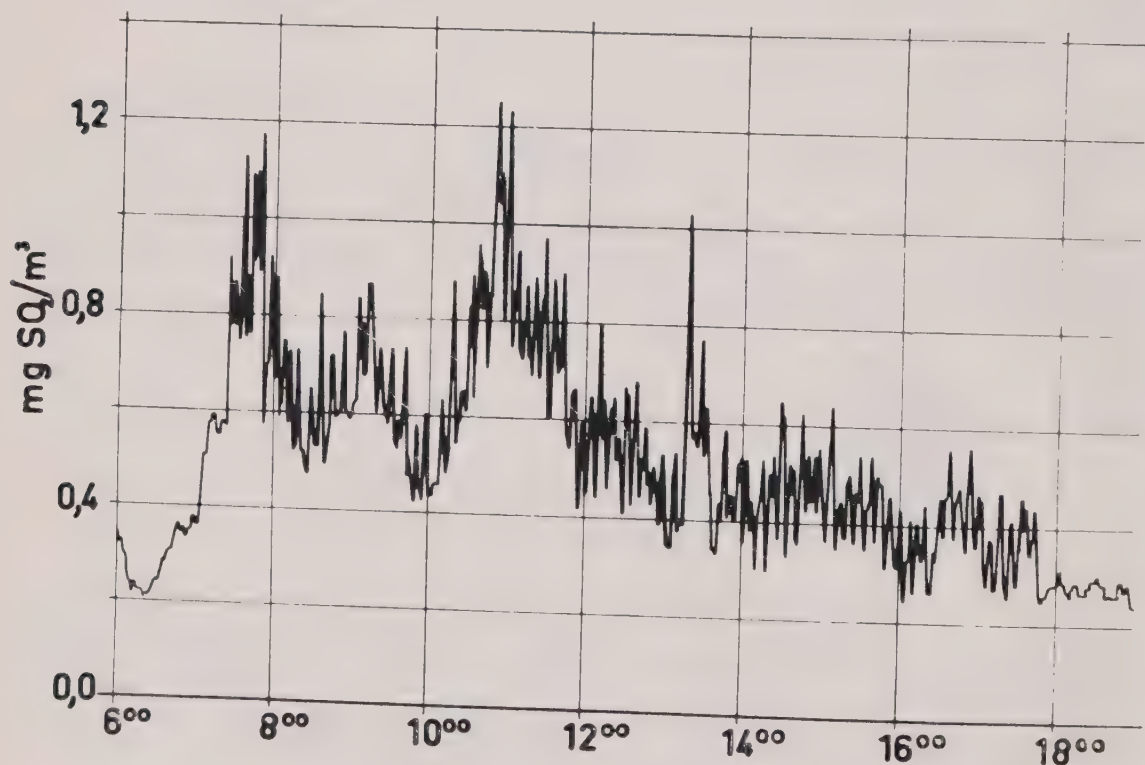


FIGURE 1



This record shows the emissions of a furnace burning oil (maximum rate 30 kg/hr, chimney 3 m above the roof of a one-floor building) from about 0700 to 1730, measured at a distance of 40 m and at a height of 10 m. The hourly mean increased from 0.28 mg SO<sub>2</sub>/m<sup>3</sup> (i.e. the SO<sub>2</sub>-amount already coming from other sources) to 0.78 mg SO<sub>2</sub>/m<sup>3</sup> when the furnace was working. On this day the wind blowing from WSW with 0.6 to 1.7 m/s carried the emissions from the source to the measuring place, so that commencement, working, breaks, and the end of burning were easily recognised. Usually, it will be much more difficult to find such sources.

In such cases it has been found useful to determine from continuous records a SO<sub>2</sub>-windrose as in Fig. 2. Here SO<sub>2</sub> was measured in a suburb comparable to a health resort, and the half-hourly SO<sub>2</sub>-values were correlated to the corresponding wind values. Finding of sources will be even easier with two or three SO<sub>2</sub>-windroses from different places as demonstrated in (3), (5), and (6). But SO<sub>2</sub>-measurements are not necessary if all the sources emit their exhaust gases into the free air stream so that no ground plants or buildings can be affected by SO<sub>2</sub>.

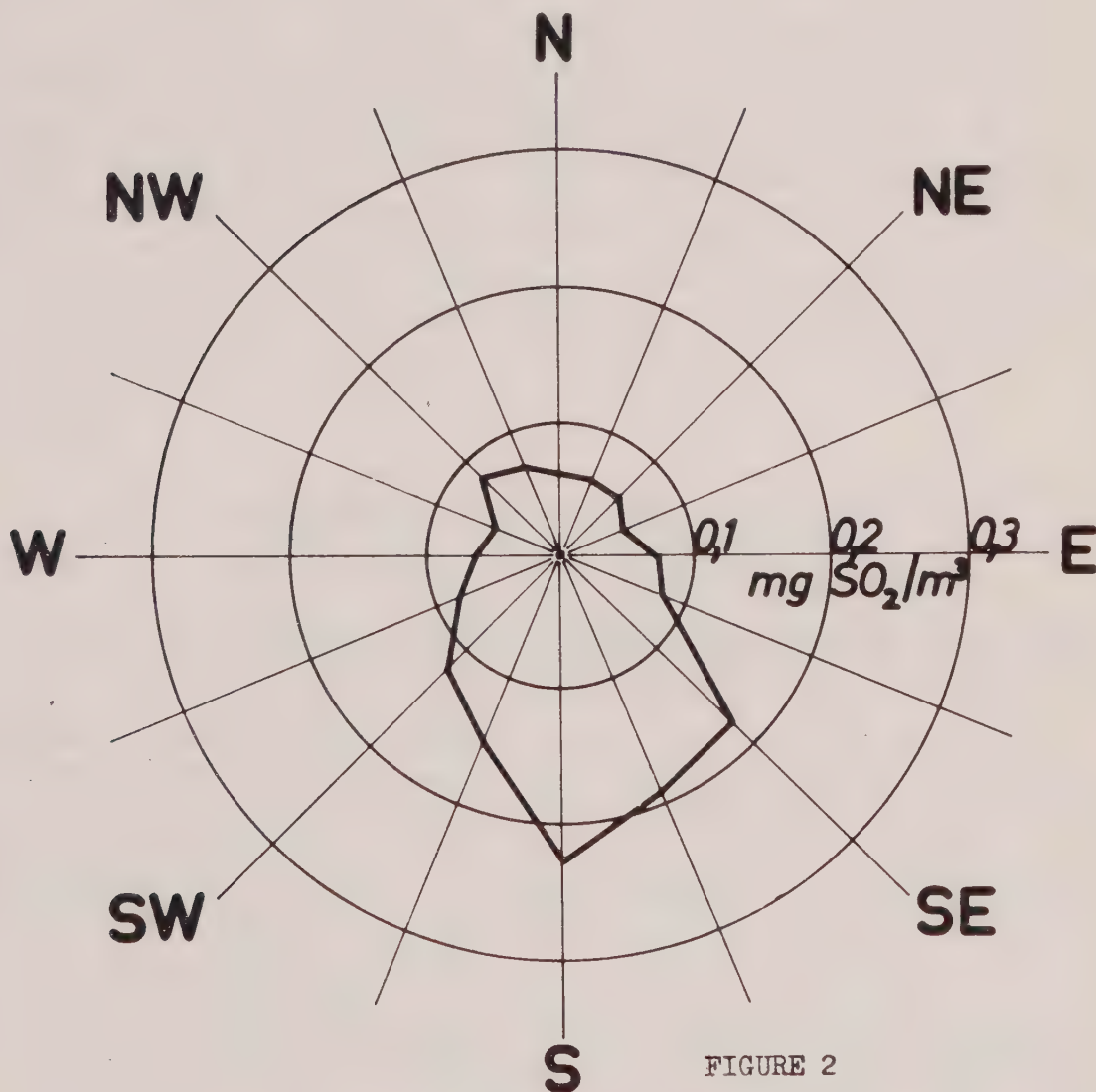


FIGURE 2

A new source of SO<sub>2</sub>-emissions is provided by modern swimming-bath with warm water, heated by furnaces burning coal, coke or oil. Such swimming baths are not only to be found in seaside resorts but also in valleys. Without repeating the emission data of such swimming baths given in (2), it is emphasized that the authorities in health resorts would be badly advised to try to avoid expense by building too low chimneys which pollute the air, spoil the plants (7) and the well-being of the guests, because the losses by the facts mentioned will become higher.

Summarizing, it is recommended that a much better air quality should be demanded in health resorts than in ordinary domestic and industrial areas (8). Apart from other considerations, patients and visitors at health resorts have a right to expect clean air there—at least air cleaner than at the place at which they used to live. In order to meet this demand, the authorities at health resorts should not only fulfil the provisions of the Clean Air Act (4) but they should do more for clean air than the law dictates. If this line of reasoning is followed the very air will contribute to the success of the time spent in re-creation.

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## U.S.A.

### Aspects of American Air Pollution

*Dr. G. Nickless, the University of Bristol*

(This paper was delivered to the A.G.M. of the South West Division of the Society at Bristol in March 1970.)

The situation in the United States is similar to that in Britain, which is probably not so surprising since our society and technologies are very similar. However, certain levels of air pollutants they endure would not be accepted by ourselves. It is not easy to find a topic more likely than air pollution to cause vigorous debate and sometimes violent argument. This is especially true among scientists and engineers, dependent on whose side they represent, all of whom must seek out and apply basic chemical and physical principles. Thus the cause and effect relationships must be deduced, and such a debate is often a sign of serious gaps within the scientific and technological framework that will be required to support a rational management of the air environment.



The amount of knowledge has and will have to be worked out in the teeth of formidable scientific odds. Contaminants in air must be detected and measured at concentrations in parts per million or less. The success of the effort will rest on the knowledge obtained in four broad, but inter-related areas:—

1. The flow and dispersion of air contaminants and their degradation or conversion to other chemical and physical forms in the local, regional and global atmospheres.
2. The means of avoiding the generation of air pollutants or of abating pollution if it cannot be avoided.
3. The effects of air pollutants on plant, animal and inanimate objects and materials.
4. The means of detecting and measuring air pollutants and their effects.

In the U.S.A. the data on the concentrations of air pollutants is gathered by local and State authorities as well as the surveillance network of the National Air Pollution Control Administration (NAPCA) within the Department of Health, Education and Welfare (HEW).

The legislation framework for managing the air environment is based on the Clean Air Act, 1963, as amended by the Air Quality Act, 1967.

The U.S.A. has been divided up into eight areas, and within these areas there will eventually be 57 air quality regions which will cover some 70% of urban population. Some six regions have already been fully defined and established over metropolitan areas of New York City, Philadelphia, Chicago, Denver, Los Angeles and Washington, D.C.

Now HEW *must* publish air quality criteria for specific pollutants as well as all necessary information on cost and effectiveness of such control systems or techniques used to abate these pollutants.

On the basis of these criteria, each State will develop an air quality standard and plans for implementing it. If approved by NAPCA, money will be granted to help carry out tasks. Also, NAPCA offers many air management quality training courses to help to alleviate the lack of trained personnel

The only documents published so far on criteria and control technology are one on sulphur dioxide and one on particulate matter, both of which were published in 1969. Work is now in progress on (a) photochemical oxidants, (b) carbon monoxide, (c) atmospheric fluorides (especially from brickworks and phosphate mining), (d) nitrogen oxides and (e) hydrocarbons. Plans are being developed for beryllium, hydrogen sulphide, odours, lead, asbestos, pesticides, rocket fuel and combustion products, other heavy metals, carcinogens and aldehydes.

In the United States the major pollutants are similar to our own case:

1. The internal combustion powered transportation systems—which are major sources of CO, oxides of N, and hydrocarbons.
2. Central power generating stations for electricity and coking industry—mainly responsible for the hydride (80% of S) and oxides of S (20% S). (Here we could add coal fires).
3. Industry to be the principal source of particulate matter and miscellaneous but insidious pollutants such as volatile organic materials and dry cleaning fluids. For example 2.5% of annual production of petrol is lost by evaporation.

The five most common primary air pollutants emitted annually in U.S. in tons are: CO,  $72 \times 10^6$ ; sulphur oxides,  $26 \times 10^6$ ; hydrocarbons,  $19 \times 10^6$ ; nitrogen oxides,  $13 \times 10^6$ ; and particles,  $12 \times 10^6$ .

But rankings in terms of weight alone do not parallel rankings in order of effects produced. Some primary pollutants are much more chemically reactive than others. Some may and do interact with other substances in the air to produce secondary pollutants that exert relatively large effects in relatively low concentrations.

There is one special case, carbon dioxide, a product of combustion, not normally included in air pollutants mainly because it is very, very doubtful in the extreme that its emission can be controlled except by replacing combustion process with another source of energy. And these alternatives would doubtless bring their problems.

One of the basic problems in establishing the base lines of what a good environment should be. Plainly, if we accept our society today, man is a powerful interferent with his environment. In many cases we can only set a tolerance limit, and not as was hoped a 'zero tolerance'. The difficulty is now what is a reasonable base line and there are very few precise data on concentrations of air pollutants, prior to 1950. For example, to check CO<sub>2</sub> level in air it needs to be known to 1 part in 10<sup>4</sup>.

Thus one large area of activity within the States is the development of analytical methods, specific, accurate and quick, which will replace some of the old wet chemical methods—which could be called the first generation methods. The second generation methods tend to operate on the principle of direct observation of a physical property characteristic of the gas to be measured, *or* on a principle of measurement of a physical change upon reaction of gas of interest with another gas or reogen supported on a surface upon which measured gas impinges. Thus we have:

- (1) Ozone analyzer—chemilumiscence of O<sub>3</sub>, with Rhodamine B on silica gel.
- (2) SO<sub>2</sub> detection by burning in a fuel rich flame.
- (3) CO and CH<sub>4</sub> analyzer on g.C.C. principles.

But they are not cheap to construct or run, and even the third generation is now being mooted.

The U.S.A., and especially the State of California, have taken the 'bull by the horns' on motor-cars. In California, the going thing is a 360 to 440 B.h.p. motor which does about 11 miles to an American gallon (our gallon is, I believe, the only thing we have which is bigger than theirs). There is a real need to reduce pollution due to cars. Los Angeles, its green-brown days come to mind; *red alerts* when school children do no exercise or are even sent home have occurred. Records show that 29% of days in 1964 and 1965 were smog-photochemical smog days.

The complete process is not understood fully, but is thought to involve interactions of nitrogen oxides, unburnt reactive small molecular weight hydrocarbons, and ozone in a type of chemical goulash.



What is important is that legislation now exists to force limits downwards. Thus for the State of California the rules are as below:

Exhaust	Emission from Air Uncontrolled	Allowable	
		1968	1970
Hydrocarbons	900 p.p.m.	275	180
Carbon monoxide	3.5 %	1.5 %	1.0 %

Similar limits are being placed on (a) blowby hydrocarbons and (b) evaporation on carburettors and tank.

One very big problem with all the control devices fitted to a car is a human one. All control devices decrease engine performance slightly, but so many owners find it tempting to disconnect or disable them. This leads to real problems in training mechanics to make necessary adjustments once you have caught the offender. Also, folklore says the devices are unworkable in the mountains, or extreme cold, since engines will not start. So they have their problems.

But so far there is no control on nitrogen oxide emission, or lead. Although there is growing feeling against lead, since one can buy non-leaded petrol (5d. gall. dearer). The methods to control these emissions are only in the development stage.

The manufacturers will now run into a severe problem if it is necessary to legislate further to remove much more of the exhaust gases. To do so will require much more complex systems and two appear in process of development:

1. An exhaust manifold reactor. This replaces the usual exhaust manifold and the basic principle is to allow exhaust gases sufficient time to react at room temperature to achieve a high degree of oxidation of hydrocarbons and CO. The manifold is very big, fitted with air injection—but even here life is very limited due to erosion of metal by metal air-borne particles.

2. A catalytic reactor. This promotes oxidation of hydrocarbons and CO to CO<sub>2</sub> and H<sub>2</sub>O. Air is injected to maintain necessary oxidising atmosphere. But the catalyst is easily deactivated by lead and other metals in gasoline. So the problem is where do you go from there.

It is of interest to note that Fords of America and the Mobil Oil Company have now built and in the near future intend to market a 'clean' motor car, its engine emitting only about one-fifteenth to one-twentieth the fumes of today's cars. What is interesting is that Fiat of Italy and three separate Japanese car manufacturers have joined in the 'Inter-Industry Emission Control Programme'. Apparently British manufacturers were invited to participate but declined. However, the whole question of exhaust pollution is now so vital to any manufacturer who wishes to sell vehicles in the U.S. that British Leyland and Shell Petroleum have set up an intensive air pollution research programme of their own. Considering the Ford-Mobil car has already been built, it may be indicative of how far we have to go to catch up.

## CANADA

The National Research Council of Canada recently announced a long-term programme designed to assist the responsible authorities in their efforts to arrest and reverse environmental deterioration.

An Associate Committee on Scientific Criteria for Environmental Quality will be established by the Council to collate and publish an integrated set of scientific requirements on which an evaluation of the quality of the environment can be based. The criteria would be designed to assist those at the Federal, Provincial and Municipal levels who have the responsibility for the formulation and enforcement of environmental quality standards.

The Committee will be served by a Secretariat within the Division of Biology of the National Research Council of Canada. The Secretariat will conduct the scientific work of preparing numerical guidelines on environmental quality for the consideration and approval of the Committee.

The Council also will establish a National Documentation and Information Centre in the National Science Library. The Centre, which will assemble world-wide available information on the scientific and technological aspects of pollution, will be established within the framework of N.R.C.'s general Scientific and Technical Information (S.T.I.) programme.

N.R.C. Associate Committees are important instruments for studying, coordinating and promoting research on problems of national significance. Their members are experts in the different aspects and disciplines related to the problem placed before them and are drawn from university, industry and government. Committees studying particular problems collect and collate the necessary information, delineate research problems, coordinate research and may recommend new research necessary to the solution of a problem.

The Council will not become formally involved in formulating or implementing legislation which will be required in the fight against pollution. However, legislation passed by responsible authorities to control pollution must be based on the best scientific knowledge available on the effects of contaminants.

The Associate Committee's unbiased experts to be drawn from university, industry and government will express these effects in the form of scientific criteria covering all quantifiable contaminants in all environments. These criteria will lay out in quantitative form the range of concentrations of each known contaminant in a particular environment which is acceptable for each possible use to which this environment might be put.

The Associate Committee will be served by a number of subcommittees which will consider specific areas, and this will enable the Council to bring together a large number of experts from all parts of the country and from government, industry and the universities.

Under the programme, the Council will not undertake or take over the responsibility for all the experimental programmes related to criteria. However, in establishing a unified set of criteria new research needs will doubtless become evident and the Advisory Committee will point out such needs.



# News from the Divisions

## South West

A meeting of the South West Division was held at the Guildhall, Bath, on Thursday, 2nd July, 1970, under the Chairmanship of Alderman G. Hebblethwaite, C.B.E. Delegates and members were welcomed to the City by His Worship the Mayor, Councillor W. Huggett. In his address Councillor Huggett stated that he regarded any pollution to be an assault upon the environment, but that control measures were costly and there was a tendency to wait for others to act. Concerted action is necessary to tackle the problem and Councillor Huggett expressed regret that Bath has not been able to establish any Smoke Control Areas up to the present time.

After a short business meeting, the speaker, Mr. John Lewis, B.Sc., Dip.Ed., who is a lecturer at the Brighton Polytechnic, was introduced. Mr. Lewis is keenly interested in the problem of pollution, or waste, as he prefers to call it, and has carried out a good deal of research on the subject.

In presenting his paper, Mr. Lewis stated how much he admired the combination of two very successful careers, those of civil servant and reformer, managed by Edwin Chadwick. He quoted Chadwick—"surrounded by filth, there are some evils which cannot be avoided by any exercise of prudence on the part of the poor. They are only removable by the intelligent arrangements of public authority". In the year this was written, 1838, there were 14,000 cases of typhus notified in London alone, and the expectation of life of a labourer in a town was less than 20 years. The connection between dirt and disease was clearly established some years before, yet it took another 43 years before those "intelligent arrangements" were made. Mr. Lewis expressed the hope that the new waste problem could be tackled long before it reaches these proportions.

The present problem has arisen in a similar way to the original one—by people living and working in high concentrations and, today, producing much more waste than ever before. Some problems are so obvious to the senses that it can be anticipated that the "intelligent arrangements" will be made shortly before they are needed. One aspect of the problem is very difficult to appreciate, the problem of invisible aerial waste or air pollution. Mr. Lewis dealt solely with waste discharged into the air which does not assail our senses but may well affect our bodies.

He put forward two views of pollution, firstly that any adulteration of the environment is bad and should be prevented, and secondly, that we should be sure by all means known to man that this invisible pollution is doing no harm. If harm is being done action must be taken without delay. The search for physical impairment has occupied many capable people for many years, yet close examination of their results leaves one rather less than convinced that a link has been proved. Mr. Lewis suggested two reasons for this lack of success, too much dependence on average concentrations of

pollutants, and the way in which these average concentrations are used. He referred to work which he carried out in Brighton where 26 National Air Survey Meters were placed around two National Survey sites and very substantial variations in levels of sulphur dioxide were found—sites within 0.3 Kms differed by more than ten times. He emphasised the great need for improved and cheaper equipment to provide a continuous record of pollution levels and to give objective measurements of the condition of the people exposed to it.

Mr. Lewis then turned to mental rather than physical impairment, a relatively new concept, and referred to work which he has carried out on the short term effects of traffic pollution on people. Tests showed that mental alertness and accuracy was impaired when breathing air polluted by motor vehicle exhausts. Some measurements were carried out in conjunction with these tests and these showed that occupants of cars with ventilation systems the air intakes of which are about 16in. from the road and placed in front of the car, were most vulnerable. Further measurements showed that with regard to pedestrians, children were most vulnerable.

Mr. Lewis concluded his paper with a plea. He believes that there is sufficient evidence that pollution of the air by insensible gases is causing us harm, but we have an effect without a known cause. More facts are urgently required so that action can be waged against the culprits. Other countries have taken action against traffic pollution and have limited those constituents which can be conveniently measured and controlled without putting the internal combustion engine off the road. The justification is that by reducing those pollutants, the total pollution level, including the damaging one, is reduced. This is a fallacy as reducing one component often increases another. There is no evidence that carbon monoxide is harmful—the Medical Research Council has found no measurable effect up to 100 ppm.

We have a measurable effect, we urgently need to know what is causing it, and this could be done at a fraction of the cost of the present world action against possibly blameless suspects. If the real criminal were found Mr. Lewis hopes that “public authorities” would not be slow to make the necessary “intelligent arrangements”.

The discussion was opened by Mr. Philip Draper who congratulated Mr. Lewis on his energy and work in research. With regard to 150 years on from Chadwick, Mr. Draper regarded the social evil as traffic pollution, and he took the view that any undesirable pollution which can be removed should be removed without having to prove harm. With regard to the sulphur dioxide concentrations referred to in the paper, Mr. Draper observed that these will vary greatly with meteorological conditions such as wind and humidity. With regard to Mr. Lewis's plea at the end of his paper, Mr. Draper's opinion was the reverse of that expressed by the speaker. He stated that we know the undesirable gases which are emitted in the exhaust gases but it is not proven how much harm is done. All pollutants should be removed and it should be noted that in doing this the efficiency of the internal combustion engine could be improved. Dr. S. R. Craxford of the Warren Spring Laboratory stated that carbon monoxide can be substantially reduced, but in doing this the oxides of nitrogen emitted will be increased. He asserted that until the medical profession tell us which is the more dangerous of these gases it would be wrong to make any move. With



regard to the National Survey sites Dr. Craxford stated that he has always said that winter averages will conceal peaks of up to ten times those concentrations. Replying to this point Mr. Lewis stated that if we are to correlate the cause and effect we must have regard to peaks even within a 24 hour period, and to do this a personal instrument is needed in order to measure the daily experience.

A long and lively discussion ensued in which Mr. Hudson of Lydney RDC, Dr. Ross, the Medical Officer of Health for Bath, and Mr. Kirkman of Poole CBC, participated.

*G. J. Creech, Hon. Secretary.*

## South East

On 14 May a meeting was arranged by the South Eastern Division of the Society, when Mr. M. J. Edwards, Director of Domestic and Industrial Sales of the National Coal Board, addresses the Meeting on "Solid Smokeless Fuel—the present and future supplies".

There are two elements in the present situation that must not be confused—short term in balance in supply and demand and the likely market position two or three years ahead.

It was obvious by the end of last year that the 1970/71 winter could see an appreciable shortage of smokeless fuels, possibly of the order of 8 per cent. The demand estimates for next winter showed nothing new. They were in line with forecasts made some years ago. The problems have been entirely on the supply side.

The main factor has been the speeding up of the closure of coal carbonising gas works. This only emerged at the end of last year and is far quicker than was thought likely even last autumn. Other contributing factors have been that B.S.C. have withdrawn most of their coke from the domestic market to satisfy their own demand and that the N.C.B. Homefire and Roomheat plants have not come up to expectations (although Multiheat has done rather better than expected).

When this problem emerged there was no time to put up additional production units as these take 18 months/2 years to get into operation. Plans are being made for further extensive building but they will not be producing in time.

Five broad courses of action were proposed by the Board to the Government:—

(a) Local Authorities should be asked to convert as much of their non domestic space heating boilers now using smokeless fuel. Many of these boilers can use alternative solid fuel with much lower running costs and the Board is prepared to assist the change-over with a special leasing arrangement.

(b) Local Authorities have been asked to defer new Smoke Control Orders and some of the older ones where gas coke has been the main fuel used. The latter is most unpalatable to local authorities but the gas coke just cannot be replaced in time.

(c) We want to see the closure of gas works deferred. This would be the best solution to all. Three gas works in the north west have now been retained in operation.

(d) We have arranged for some of our stocks of Welsh Duff to be processed at briquetting plants in France which have unused capacity. The briquettes are similar to Multiheat and the majority will flow into the south.

(e) Finally we have carried out a comprehensive re-contracting operation for smokeless fuel. This does not increase availability but it improves the efficiency of the distribution of what there is.

It is the board's view that if these five courses of action are energetically pursued, then there is every reason to expect that we will get through next winter without a widespread shortage given normal weather.

If there are shortages these are likely to be confined to specific areas and certainly the position in the South looks better than average.

Looking beyond the immediate unbalance in supply and demand the position is very different.

The cutback in gas coke production had hurt the availability of open fire smokeless most but it was here that increase in new availability was likely to come quickest and in the greater tonnage.

On the other hand, demand from this market is likely to fall primarily because it is a market greatly affected by demolition and when people decide they want some central heating, it is common practice to replace the openfire with a roomheater. Looking forward therefore one can see quite an easy balance being struck between supply and demand.

In the case of closed appliance smokeless fuel is seemed unlikely on present plans that there would be any sizeable net increase in availability, but within the present total sale of about 7.2m. tons to both domestic and non domestic purposes about 1.8 is supplied to non domestic use which clearly have a short life and a further 2.3m. tons was used on independent boilers, many of which were now coming up for renewal.

Only just over 3m. tons is used on roomheaters which is the long term market and the remainder must be considered to be vulnerable to replacement. There is therefore still headroom for the development of the conventional roomheater.

The Board consider however that the best answer in the future is to burn bituminous coal smokelessly. There would then be ample availability of fuel for smokeless combustion. The price per ton is much lower than conventional smokeless fuel and used on high efficiency appliances running costs would be cut to a record low level.

There is one rather specialised boiler burning bituminous coal smokelessly, the Triancomatic, commercially available already and this is capable of further development to increase its capacity. Of much wider interest in the boiler field however is a gravity fed boiler which would burn bituminous coal smokelessly which is now in the pre-production prototype stage. This would produce about 55,000 Btu's and in appearance and price should resemble an anthracite gravity fed boiler.

Development work has been concentrated on getting a bituminous coal burning roomheater on to the market. A test market of the first model, the Housewarmer, has been going on for about a year now. This has revealed some problems but problems which are capable of fairly straight forward



solution mainly that the capacity of the appliance is less than general public demand requires certainly in the Midlands and north and certain features which are vulnerable to heavy usage.

Based on the experience with the Housewarmer further development work is now going ahead rapidly to make available to the market appliances which will incorporate all the lessons which have been learnt.

The short term situation therefore is undoubtedly a difficult one but we have a good chance of bringing it into balance providing the actions already initiated are pursued vigorously.

Long term however the position is much more favourable and will be transformed when bituminous coal burning appliances become commercially available.

Approximately twenty persons asked questions which covered the whole range of the talk. Many were searching and to the point, but Mr. Edwards answered them fully.

In conclusion the Chairman, M. W. Combey, thanked Mr. Edwards for his talk and the manner in which he had answered questions and expressed the hope that Local Authorities would go ahead with their Smoke Control programmes even though operative dates might have to be adjusted.

*R. F. Shapter, Hon. Secretary*

## East Midlands

The East Midlands Division visited the Gas Reforming Plant of the East Midlands Gas Board at Ambergate on Thursday, 16 April, 1970, at the invitation of the Board, sixty-four members attending.

Members were welcomed at the Works by Officials of the Gas Board and after a short explanatory history of the undertaking, while coffee was taken, the company divided into small parties for a tour of this extensive plant, which covers approximately 44 acres, and occupies the site of a lime works founded by George Stephenson and Company in 1837, and which continued in operation until 1965. The development of this plant was intended to meet the rapidly increasing demand for gas in the East Midlands Area by non-traditional methods, before it was established that workable quantities of natural gas existed in the North Sea off the east coast.

Gas is produced from a light petroleum distillate thus giving the Gas Board a degree of independence from the Coal Industry. The Reforming Plant is designed to use either light petroleum distillate or natural gas as feed stocks so that its usefulness in the year ahead is assured.

Light petroleum distillate is brought to the Works by road tanker and is stored in two 8,000 ton cylindrical tanks, from which it is fed into four identical streams of gas, making the plant capable of producing 135 million cubic feet of towns gas per day.

While gas production is at present confined to the reforming of distillate, a section of the plant is set aside to receive and process liquified natural gas which might safeguard supplies to the National Grid at peak periods. Liquified natural gas is brought to the plant by road tankers from the Gas Council terminal at Canvey Island, and is stored in an insulated tank which has a capacity of 5,000 tons—the storage temperature being  $-258^{\circ}\text{F}$ .

The liquified natural gas is converted to towns gas by evaporation, using steam heaters, the 5,000 tons being equivalent to 250 million cubic feet of natural gas for injection into the National Grid.

Walking round the works members were impressed by the complete absence of the smells usually associated with gas making; and it was of interest to learn that the gas produced at this plant had to be odourised to meet statutory requirements before distribution.

After a most interesting tour of the Works, members were entertained to an excellent luncheon at the Court Barbecue Restaurant, Allestree, at the kind invitation of the East Midlands Gas Board.

The afternoon session was devoted to a talk by L. W. Jarrett, Esq., the Divisional Commercial Manager of the East Midlands Gas Board, the subject being "North Sea Gas Utilisation and Conversion Strategy". This proved to be a most interesting and instructive address, in that it dispelled many of the doubts and fears which have been expressed concerning the long term availability of natural gas from the North Sea and answered much of the adverse publicity levelled against the conversion programme and use of this new form of heat in the domestic field.

As to the availability of natural gas Mr. Jarrett stated that 260 wells had been drilled in the North Sea and of these, over 130 produced gas, 13 in highly successful quantities, and to date 137 miles of under-sea gas mains had been laid to bring the gas to land. He stated that the present extraction rate was 1,700 million cubic feet, but it was anticipated that the requirements in the 1970's would be of the order of 4,000 million cubic feet.

Dealing with the conversion of appliances to use natural gas, Mr. Jarrett said that the Gas Board had undertaken the biggest "crash programme" ever attempted, and while it was inevitable that some problems and difficulties would arise, these were relatively small compared with the size of the undertaking. It was stated that the Gas Board had not sufficient fitters on their staffs to carry out all the conversions within the time permitted and in consequence, outside fitters had to be called in which added to the initial difficulties. In the early areas converted, "call backs" were 1 in 3, now it is 1 in 5 and 15 per cent of these calls were for single simple adjustments.

Mr. Jarrett's talk provided a lively discussion in which many members took part.

Closing the session the Chairman, Councillor J. H. Gregory, thanked the speaker for his valuable contribution, the East Midlands Gas Board for their generous hospitality and expressed the appreciation of the members to all of the officials who had contributed to this very successful meeting.

The Annual General Meeting of the Division was held at the Miners' Community Centre, Snibston Colliery, Coalville, at 11.15 a.m. on the 9 July, 1970, at the kind invitation of the National Coal Board, seventy members attending. Members were welcomed by Mr. H. B. Dunstan, Head of the Domestic Sales Branch, N.C.B. Midland Sales Region, on behalf of the Board.

At the close of the business meeting, a film, produced for the National Carbonisation Company entitled "Breathing without Tears", which described the manufacture of Rexco and demonstrated the contribution that Company is making to the cause of Clean Air was shown.



Members were then entertained to an excellent buffet lunch at the kind invitation of the National Coal Board.

The Afternoon Session was devoted to a study of, and visit to, the City of Leicester District Heating Scheme at the Rowllatts Hill Estate.

Mr. J. Ramsdale, the Technical Adviser of the National Coal Board, briefly described this complex of 507 dwellings which, together with shops, and Old Persons' Home and a Childrens' Home, are heated from a central source using an indigenous fuel.

Mr. Gregson, the Deputy Housing Manager, welcomed the Members on behalf of the Leicester Housing Department, and stated that the aim had been to provide a balanced community of this Estate, there being seven types of dwellings ranging in size from large three bedroomed family houses to single storey bungalows, built terraces and two 24 storey blocks of flats.

After these introductions, members were shown an excellent film of the Rowllatts Hill development and thereafter made a tour of the 20 acre estate in the City of Leicester, which is situated attractively in the Crown Hills district. Particular interest was shown in the heating system. The boiler house is constructed partly below ground level adjacent to one of the 24 storey tower blocks, the chimney flue being constructed as an integral part of the tower block. Four welded steel boilers each having a rating of 4,770,000 btu/h, are fired by underfeed stokers using Leicestershire Washed Singles, fuel being delivered to the bunkers by a special pneumatic delivery vehicle via a 5in. delivery pipe, thus cutting down pollution in this section. Ash extraction from the furnaces is equally dustless, the ash being discharged into large containers situated below boiler house floor level and these are removed once weekly by the City's Cleansing Department. Each individual dwelling is heated by radiators, and has a 30 gallon domestic hot water supply, the cylinder being heated by means of a coil connected to the mains.

The distribution system is a two pipe, high temperature drop system having a maximum heat flow of 194°F with a return at 124°F, the mains being housed in underground concrete ducts constructed under the walk ways of the Estate, and insulated to prevent heat loss by cellular concrete. This internal system is divided into two separate channels, one to meet the requirements of the ninth and higher storeys of the tower blocks and the other, the requirements of all other dwellings. The system is designed to give a temperature of 70°F in all rooms, with a minimum outside temperature of 25°F. Heat meters are fitted to all the 2,400 radiators and the domestic hot water cylinders and proportional payment system for this heat service is operated by the Corporation.

Members were given the opportunity of visiting a representative number of the dwellings to obtain the tenants reactions to this type of heating which were, almost without exception, favourable.

At the close of a most successful meeting and tour of inspection the Chairman proposed an omnibus Vote of Thanks to our hosts and all those who had contributed to its success.

*G. Drabble, Hon. Secretary.*

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# Air Pollution Abstracts

**1186. The Uses and Limitations of Trend Surface Analysis in Studies of Urban Air Pollution.** Anderson, P. M. (Atmospheric Environment, 1970, 4, 129-147). Trend surface analysis, a technique of areal regression, is presented as having potential use in studies of air pollution. The technique is applied here to observations of smoke and sulphur dioxide concentrations in the West Midlands (Birmingham) Conurbation, England. There is a discussion of the success and limitations of the technique in describing broad areal patterns of pollution, in indicating the extent of drift of pollution and in determining local departures from these broad patterns for use in modifying diffusion models for urban areas. From the situations investigated, the analysis appears to have potential use only for mapping generalized patterns.

**1187. First Municipal Incinerator with Pollution Control System is Successfully on Line.** ("Chemico World", December 1969, 4, 11-13). The article describes the first municipal incinerator in New York City to be equipped with a modern pollution control system, which has been in service 24 hours a day, six days a week, since June 1969. The heart of the system is a venturi scrubber, a wet gas cleaning method originated by Chemico. The scrubber is installed on a furnace which disposes of 220 tons per day of municipal refuse and reduces the daily stack discharge to three ounces of particulate per 1,000 pounds of gas. It also prevents about one ton a day of hydrochloric acid and other gaseous contaminants from polluting the atmosphere. The article says that the unique ability of this wet gas cleaning technique to remove gaseous pollutants, in addition to fly ash, or solid pollutants, is its outstanding feature. In contrast, the dry method of gas cleaning eliminates only solid pollutants. The fact that polyvinyl chloride (PVC), which is increasingly being used in disposable packaging when burned in an incinerator furnace, throws off hydrochloric acid and other

extremely caustic corrosive gases makes the capability of the Chemico scrubber to control the gaseous acids as well as the solid waste a major advance in pollution abatement.

**1188. The 'Optimometer'—A Device for Automatic Control of Smoke Emission.** (Steam and Heating Eng., March 1970, 30-33). The article describes the Optimometer, developed by Hamworthy Engineering, which monitors stack conditions and automatically adjusts burner air/fuel ratio to hold smoke emission at a predetermined level. In its present form the Optimometer is suitable used on boilers fired by a single oil burner with f.d. or i.d. fan, although equipment can be modified for use on other plant configurations. In essence it is a servo mechanism interposed between the oil and air supply control, the error signal required being derived from photocell equipment in the exhaust flue from the boiler. It replaces the conventional linkage between oil valve and air damper, allowing the oil:air ratio to be trimmed as required. After describing the photocell unit, the combustion controller and the operation of the equipment it states that the Optimometer offers two main advantages in the operation of oil-fired plant. Firstly by allowing boilers to be operated within the tolerances prescribed by the Clean Air Acts and secondly it offers the possibility of savings in fuel due to more efficient combustion with optimum excess air.

**1189. Improved N.C.B. Apparatus for Measuring Flue Gas Dust Concentrations.** (Steam and Heating Eng., February, 1970, 12-15). An important feature of new grit and dust sampling equipment developed by the National Coal Board is the elimination of filters for removal of the dust burden. The equipment is designed for use with coal fired boilers.

**1190. Atmospheric Pollution in Great Britain.** (In French). Craxford, R. S., and Weatherley, M. L. P. M. (Pollution Atm., October-December 1969, **44**, 187-194). The authors sum up the situation in Britain in 1968, and draw up a forecast for future developments in air pollution, using statistics already established to interpret the results of investigations of concentrations of polluting agents in the air. Several tables and graphs show the relationship between trends in fuel consumption and the production of black smoke and sulphur dioxide from 1962 to 1967, as well as forecasts for 1970 and 1975. The authors show that the Clean Air Act has proved most successful, with consistently beneficial results. They emphasize the importance of setting up of numerous "smokeless zones" in the reduction of pollution recorded in Britain. In conclusion, the authors declare that efforts should not be relaxed, and that this positive achievement reflects general progress in Britain.

**1191. Field Studies of Air Pollution Injury to Vegetation in Cincinnati, Ohio.** Reinert, R. A., *et al.* (Plant Disease Repr., January 1970, **54**, No. 1, 8-11). Air pollution in Cincinnati caused plant injury in the field. Injury is described for petunia, bean, radish, squash, tomato, alfalfa, oats and tobacco. Plants grown in a charcoal-filtered-air field chamber were uninjured while those grown in a similar unfiltered air chamber were injured. Continuous measurements of oxidant (ozone), nitrogen dioxide (NO<sub>2</sub>) and sulphur dioxide (SO<sub>2</sub>) were made from June 10-September 15, 1968. Injury in the field was greatest after days when the oxidant levels were high.

**1192. Air Quality Criteria for Sulfur Oxides.** Middleton, J. T. (U.S. Natn. Air Pollut. Control Adm. Publ., 1969, No. AP-50, 178). The article reviews the chemical and physical characteristics of sulphur oxides, and considers the various analytical methods for measuring them in the atmosphere.

**1193. A Realistic Vehicle Emission Inspection System.** Clive, E. L., and Tinkham, L. (Jnl. Air Pollut. Control Ass., April 1969, **19**, 230-235). The one-minute mass vehicle exhaust emission inspection system described provides probable causes of unnecessarily high

emissions for each rejected vehicle. Low-skill levels may be used in inspection process, yet results are repeatable and consistent in several stations. The rejection standard is variable.

**1194. Meteorology and the Clean Air Act.** Brazell, J. H. ("Nature", Vol. 226, May 23, 1970, 694-696). The article deals with fog in Greater London, Manchester, Yorkshire, and Glasgow, and gives tables and diagrams of numbers of hours of fog and percentage frequency of visibility at various sites in these areas and goes on to give tables of average monthly sunshine at the London Weather Centre, Kew Observatory and Wisley during 1958-1967 as a percentage of the average for 1931-1960. The author concludes by saying that there has been a steady improvement in visibility at both urban and rural sites during the last decade or so, particularly marked in some 'black areas' and there has also been an outstanding increase in winter sunshine in central London during the same period. He attributes this improvement to the Clean Air Act, 1956.

**1195. The Big Business of Dirty Air.** ("Chemistry and Industry", June 27, 1970, 840). Deals with air pollution in the U.S. where concern has reached federal levels, with President Nixon's appointment of a three-man Council on Environmental Quality and of a 53-man National Industrial Pollution Control Council. The President has revised federal spending for anti-pollution measures, but the main problem continues to be the economic one. Research into atmospheric chemistry will be greatly assisted when models can be constructed to imitate the local variations and complexities of conditions in urban basins. A great many air pollutants such as CO, SO<sub>2</sub> polynuclear hydrocarbons, flyash and trace metals are undergoing increasing scrutiny. Accurate measurement is stated as the first step to efficient control. Many U.S. stations have pollution monitoring stations and the National Air Pollution Control Administration is planning to develop a national air quality data bank. Controversy centres on the removal of lead alkyl antiknock compounds from petrol. Some companies have brought out unleaded petrols and some control



devices. Meanwhile other fuels, especially natural gas, and alternative power sources are being sought, as people become uneasy about the high sulphur content of coal burned by electricity power stations. Control of SO<sub>2</sub> in stack gases has been attempted. Chemical firms have set up subsidiaries aiming at the pollution control market.

**1196. Flexibility of X-Ray Emission Spectrography as Adapted to Micro-analysis of Air Pollutants.** Leroux, Jean, and Mahmud, Mazhar. (Jnl. Air Pollut. Control Ass., June 1970, **20**, No. 6, 402-404). Methods for analysing thin dust coatings of airborne particulates have been further evaluated, as applied to vast air pollution surveys. It was demonstrated that choice of glass fibre filters adapted to high-volume samplers restricts the analysis to a limited number of elements, such as lead. More flexibility and versatility are attained through the use of organic membrane filters mounted in small plastic monitors which permit multi-elemental analysis at least as accurately as with other popular but time-consuming techniques. These qualities of speed and accuracy allow shorter intervals of sampling which are normally required for better statistical assessment of broad air pollution surveys. Concludes that the addition of a fully automatic X-ray emission spectrometer to the basic equipment of an air pollution network would add still more efficiency to the conduct of a large-scale and long-term atmospheric survey.

**1197. An Examination of Current Practice and Trends in the Disposal of Waste and Refuse, with an Emphasis on Incineration at Source.** Teale, John R. (Presented to the North West Division of the National Soc. for Clean Air, April 1970). This paper gives details of how the nature and composition of domestic refuse and industrial waste is changing, due to the development of smokeless zones and smoke control areas. It shows how, with this change, the collection and disposal of this refuse and waste is becoming more problematical. An examination is made as to how to overcome this problem by (a) reclamation or salvage, (b) open or crude tipping, (c) controlled tipping, (d) pulverising, (e) composting, (f) central incineration, (g) bargeing and tipping in the sea, (h) incineration at source. The five appendices consist of (i) a description and definition of smokeless zones and smoke control areas, (ii) a description of the reasons for the gas industry's trend to move away from the use of coal for gas production with the consequent reduction in the output of solid smokeless fuel, (iii) a comment on the sulphur content in the atmosphere, (iv) a table giving details of the cost of collection and disposal of house and trade refuse for various authorities in the United Kingdom, (v) details of the standard test load as used by the American Gas Association for testing domestic incinerators. There are nineteen tables and forty-nine photographs and drawings, excluding the tables, etc., given in the appendices.

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### Tree Growth Affected by Smoke

A recent report in the *Guardian* states that studies of the effects of air pollution have led the Forestry Commission to abandon its planting programme in some parts of the Pennines between Manchester and Halifax. The reason is that pollution from chimneys in the Manchester area falls so heavily in south Yorkshire, that trees will not grow at all on some hills. Tests made by the Commission have shown that pollution by smoke and sulphur dioxide have made it uneconomic to plant trees in such parts.

It appears that pollution is carried from Manchester by the prevailing south west winds and comes down in rain as dilute sulphuric acid or as particles of smoke and sulphur dioxide.

The Commission's original plan was to plant at least 3,000 acres of trees in this area but the extent of pollution was under-estimated and so far only a tenth of this acreage has been planted.

# CONFERENCE PROGRAMME

## Tuesday, 20th October

10.30—Opening Session

The Conference will be opened by Eldon Griffiths, M.P., Joint Parliamentary Secretary, Ministry of Housing and Local Government.

The President, Sir Kenneth Hutchison, C.B.E., F.R.S., will deliver the Presidential Address.

Presentation of Prizes to winners of North West Clean Air Competition for Children.

14.30—Session Two

"The Clean Air Act 1968".

(a) General Experience of the Working of the Act—F. G. Sugden (Chief Public Health Inspector, Teesside).

(b) The Measurement of Grit and Dust—W. Short (National Industrial Fuel Efficiency Service).

## Wednesday, 21st October

10.00—Session Three

"The Disposal of Wastes by Incineration"—E. Higginson (Assistant Director, Public Health Engineering, Greater London Council).

14.30—Open Session

"Conservation".

(a) Man and Environment—R. E. Boote (Secretary, European Conservation Year 1970).

(b) Conservation in the North West—Stanley Jeeves (Secretary (NW) Council for Protection of Rural England).

(c) The Contribution Made by Clean Air—Dr. A. I. Ross (Medical Officer of Health, Bolton).

## Thursday, 22nd October

10.00—Session Five

"Clean Air—The Balance Sheet".

(a) Industry's Viewpoint—E. J. Challis (Heavy Organic Chemical Division, Imperial Chemical Industries).

(b) The Domestic Viewpoint—J. Kay (Chief Public Health Inspector, Stretford).

(c) The Health Balance Sheet—Professor C. R. Lowe (Department of Social & Occupational Medicine, Cardiff).

14.30—Session Six

"Clean Air—The Balance Sheet" (continued)

(d) The Viewpoint of the Fuel Industries.

(i) Solid Fuel—M. J. Edwards (Director (Domestic & Industrial) Marketing Dept., National Coal Board).

(ii) Gas—B. G. H. Clegg (Deputy Director of Marketing, The Gas Council).

(iii) Electricity—R. H. Phillips (Marketing Adviser, The Electricity Council).

(iv) Oil—Dr. A. W. Pearce (President, The Institute of Petroleum).

## Friday, 23 October

10.00—Session Seven

"Pollution from Road Vehicles".

(a) Recent Developments in the Control of Exhaust Emission from Petrol Engines—Dr. A. Thomas and R. Lindsay (Shell Research Ltd.).

(b) Pollution from Road Vehicles and Health—Professor P. J. Lawther and Dr. B. T. Commins (The Medical Research Council).



# New Smoke Control Orders

The lists below are supplementary to the information in the last issue of "Smokeless Air" (Summer 1970) which gave the position up to 31 March 1970. They now show changes and additions up to 30 June 1970.

Some of the areas listed are new housing estates, or areas to be developed for housing. The total number of premises involved will therefore increase. An asterisk denotes that there have been objections and that a formal inquiry has been or will be held.

The list of new areas in operation of smoke control is based on the plans submitted to the Ministry of Housing, but may erroneously include some local authorities who have made postponements, without notifying the Ministry of the fact.

## ENGLAND NEW SMOKE CONTROL ORDERS IN OPERATION

### Teesside

Teesside C.B. No. 4.

### Yorkshire

#### West Riding (North)

Leeds C.B. No. 79. Halifax C.B. No. 16. Brighouse B. No. 14. Sandal No. 3.

### North Western

#### South Lancashire and North East Cheshire

Salford C.B. No. 14.

### Midlands

#### Potteries

Kidsgrove U.D. No. 16.

### London

#### Greater London Boroughs

Ealing L.B. No. 45.

### Local Authorities outside the Black Areas

Hemel Hempstead B. (Adeyfield No. 1). Chatham B. No. 5A.

## NEW SMOKE CONTROL ORDERS CONFIRMED BUT NOT YET IN OPERATION

### Northern

#### Tyneside and Wearside

Hebburn U.D. No. 12. Sunderland C.B. No. 7 and No. 8. Boldon U.D. No. 17. Newburn U.D. No. 11.

### Teesside

Teesside C.B. No. 5. Hartlepool C.B. No. 18.

### Yorkshire

#### West Riding (North)

Elland U.D. (Eastward 1969 and Northward 1969). Leeds C.B. Nos. 81-84. Spenborough B. No. 11. Aireborough U.D. No. 26.

#### West Riding (South)

Sheffield C.B. No. 25. Dearne U.D. No. 6.

### North Western

#### South Lancashire and North East Cheshire

Audenshaw U.D. No. 5. Heywood B. No. 10. Leigh B. No. 11. Sale B. No. 11. Tyldesley U.D. No. 3. Tottington U.D. No. 3. Prestwich B. No. 10. Ashton-under-Lyne B. No. 11. Worsley U.D. No. 8. Stretford B. No. 14. Prestwick B. No. 11A. Horwich U.D. No. 2.

#### Central Lancashire

Great Harwood U.D. No. 12. Padiham U.D. No. 10 and No. 11. Blackburn C.B. No. 9. Colne B. No. 8.

### Merseyside

Huyton-with-Roby U.D. No. 7. Warington R.D. No. 4.

### Midlands

#### Derby, Nottingham and Chesterfield

Alfreton U.D. No. 5 and No. 6. Chesterfield R.D. No. 12. Carlton U.D. No. 6. Derby C.B. No. 19. Beeston and Stapleford U.D. No. 11. Sutton-in-Ashfield U.D. No. 1/69.

#### West Midlands

Birmingham C.B. No. 148. Sutton Coldfield B. No. 14 and B. No. 18. Wolverhampton C.B. No. 13.

#### North Midlands

Leicester C.B. No. 27.

### London

#### Greater London Boroughs

Bromley L.B. No. 10 and No. 11. Greenwich L.B. (Woolwich Town Centre, Thamesmead, St. Nicholas and Little Heath). Hounslow L.B. Brentford and Chiswick No. 11. Hounslow L.B. Heston and Isleworth No. 15, 17 and 18. Hillingdon L.B. No. 8. Merton L.B. No. 16. Newham L.B. No. 7. Redbridge L.B. No. 16. Southwark L.B. No. 26. Sutton L.B. No. 21 and No. 22. Ealing L.B. No. 51.

## **Local Authorities outside the Black Areas**

Leamington Spa B. No. 9. Reading C.B. No. 14. Tamworth B. No. 4. King's Lynn B., Reffley.

## **NEW SMOKE CONTROL ORDERS SUBMITTED BUT NOT YET CONFIRMED**

### **Northern**

#### *Tyneside and Wearside*

Blaydon U.D. No. 3. Tynemouth C.B. No. 11/1970. Newburn U.D. No. 12 and No. 13.

### **Teesside**

Hartlepool C.B. No. 19.

### **Yorkshire**

York C.B. No. 2.

#### *West Riding (North)*

Huddersfield C.B., Marsh-Grimiscar. Ripley U.D. No. 2/1970. Halifax C.B. No. 17. Leeds C.B. No. 85. Sowerby Bridge U.D. No. 9. Horsforth U.D. No. 29(a) and (b). Stanley U.D. No. 4.

#### *West Riding (South)*

Barnsley C.B. No. 12.

### **North Western**

#### *South Lancashire and North East*

#### *Cheshire*

Fairclough U.D. No. 9. Royton U.D. No. 6. Eccles B. No. 14. Salford C.B. No. 17. Bury C.B. No. 8. Little Lever U.D. No. 1. Altrincham B. No. 9. Urmston U.D. No. 10. Blackrod U.D. No. 2. Stalybridge B., Mottram Road.

#### *Central Lancashire*

Church U.D. No. 6.

### **Merseyside**

Runcorn R.D. No. 4 and No. 6. Ellesmere Port B. No. 10. Bootle and Litherland No. 1.

### **Midlands**

#### *Derby, Nottingham and Chesterfield*

Arnold U.D. No. 4. Mansfield B. No. 6 and No. 7. Sutton-in-Ashfield U.D. No. 1/1970. Belper R.D. No. 3.

#### *West Midlands*

West Bromwich C.B. No. 18 and No. 19. Wolverhampton C.B. No. 14. Dudley C.B. No. 59. Halesowen B. No. 32. Aldridge-Brownhills U.D. No. 33.

#### *Potteries*

Stoke-on-Trent C.B. No. 24. Kidsgrove U.D. No. 18. Newcastle-under-Lyme B. No. 9.

### **London**

#### *Greater London Boroughs*

Bromley L.B. No. 12. Croydon L.B. No. 12. Barnet L.B. No. 11. Wandsworth L.B. No. 4. Merton L.B. No. 17.

Harrow L.B. No. 22. Lambeth L.B. No. 24.

#### *Outer London*

Dartford B. No. 10.

## **Local Authorities outside the Black Areas**

Shrewsbury B. (Sutton Area). Canterbury C.B. (Downs Road No. 1, Westgate Court Ave. No. 2, Tennyson Ave. No. 3). Exeter C.B. Pennsylvania No. 1. Staines U.D. No. 11. Blackwell R.D. No. 1. Blaby R.D. No. 6. Cheshunt U.D. No. 6. Southampton C.B. No. 10. Oxford C.B. No. 10. Whiston R.D. (Rainhill No. 1). Rugby B. No. 13.

## **SCOTLAND**

## **NEW SMOKE CONTROL AREAS IN OPERATION**

Johnstone No. 1.

## **NEW SMOKE CONTROL ORDERS CONFIRMED BUT NOT YET IN OPERATION**

Coatbridge (Coltswood). Stirling County (Redding, Westquarter, and Laurieston (Langton)).

## **NEW SMOKE CONTROL ORDERS SUBMITTED BUT NOT YET CONFIRMED**

Dundee (Downfield East). Port Glasgow No. 5.

## **NORTHERN IRELAND**

## **NEW SMOKE CONTROL ORDERS IN OPERATION**

Armagh U.D. No. 1. Belfast C.B. No. 7. Coleraine R.D. No. 1. Larne Bord. No. 1.

## **NEW SMOKE CONTROL ORDERS CONFIRMED BUT NOT YET IN OPERATION**

Belfast C.B. No. 3.

## **WALES**

## **NEW SMOKE CONTROL ORDER CONFIRMED BUT NOT YET IN OPERATION**

Wrexham B.C. No. 4.

## **ORDERS SUSPENDED**

Since the last issue of "Smokeless Air" the following additional local authorities have been granted orders by the Ministry of Housing and Local Government to suspend the operation of their existing smoke control orders.

The effect of these Suspension Orders is from June 1970 until 30 April 1971 in most cases.

Heanor U.D. (No. 3), Aldreds Lane (until 31 March 1971). Rochdale C.B. (any orders in operation). Marple U.D. (No. 1).



# SMOKE CONTROL AREAS

## Progress Report

Position at 30 June 1970

(Figures supplied by Ministry of Housing and Local Government)

	England	Wales	Scotland	Northern Ireland
<b>Smokeless Zones (Local Acts) in Operation ...</b>	44	—	—	—
Acres, 3,400				
Premises, 41,060				
<b>Smoke Control Areas in Operation...</b>	3,000	7	141	22
Acres ... ..	781,561	1,097	74,873	7,047
Premises ... ..	4,060,261	4,979	353,299	8,459
<b>Smoke Control Areas Confirmed ... ..</b>	71	1	10	9
Submitted ... ..	65	1	4	—
<b>Grand Totals ...</b>	3,180	9	155	31

### Smoke Control Position in Regions of England at 30 June 1970

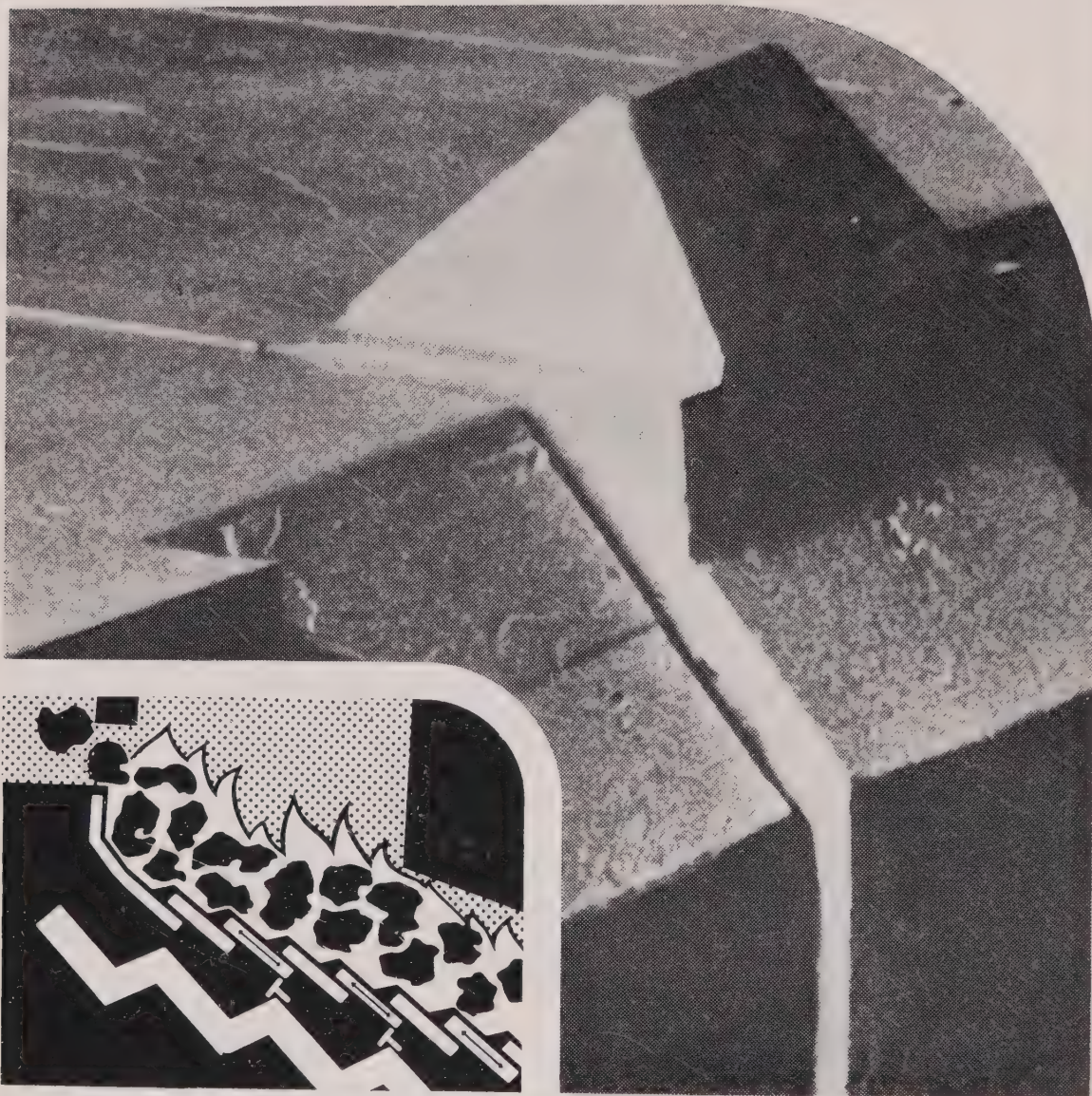
(Figures supplied by Ministry of Housing and Local Government).

(1)  Region	(2) No. of black area acres covered by smoke control orders con- firmed or awaiting decision	(3) Percentage* of total black area acreage in region covered	(4) No. of black area premises covered by smoke control orders confirmed or awaiting decision	(5) Percentage* of total black area premises in the region
Northern ... ..	38,589	30.8	157,292	28.4
Yorkshire and Humberside ... ..	180,533	47.9	595,982	51.0
East Midlands ... ..	63,807	23.8	188,953	36.9
Greater London ... ..	236,917	72.4	101,335	79.6
North Western ... ..	192,259	47.9	789,806	46.4
West Midlands ... ..	83,753	33.6	375,708	35.7
South Western ... ..	7,505	28.5	28,697	19.3
<b>Total (black areas) ...</b>	<b>803,363</b>	<b>45.3</b>	<b>4,237,773</b>	<b>54.5</b>
<b>Outside black areas ... ..</b>	<b>144,624</b>		<b>467,256</b>	
<b>Grand Totals ...</b>	<b>947,987</b>		<b>4,705,029</b>	

\* The percentage shown in columns (3) and (5) above are percentages of the total acreage and of the total number of premises in the black areas concerned. In practice it may not always be necessary for the whole of the black area authority's district to be covered by smoke control orders (e.g., there may be some areas of open country).



# what is this?



Head Wrightson are building incineration plants for Birmingham and Exeter. Both cities have chosen the Martin system of which there are now over 400 installations with grates up to 12.2 metres wide.

On the continuously reciprocating grate of the Martin system, with its even air distribution, the refuse burns quickly, and partially burned material is automatically moved back under the incoming feed material. The system produces clinker suitable for road fill.

Grate bars are cast in chrome steel and air distribution vanes are fitted. Close tolerance machining ensures positive movement of adjacent bars which keeps the air slots clear and maintains correct combustion air slot area to grate area ratio. The system, which

works up to 900 °C, has achieved burnouts of 0.01% putrescible content.

For the 350 ton per day plant at Birmingham and the 120 ton per day Exeter plant, Head Wrightson are supplying all fume cleaning equipment. They can also provide systems for the utilisation of waste heat. The large photograph shows part of the moving grate bars.

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# WINSTON CHURCHILL MEMORIAL TRUST

The Trust was established in 1965 as a unique form of National Memorial to Sir Winston Churchill.

It enables men and women, who might never otherwise have the chance, to travel abroad, widen their knowledge in their own field of activity, learn how people live and work in the different parts of the world, and as a result of the experience they gain, they are able to contribute more to their profession, community and country.

Every year the Council chooses a number of categories which reflect a broad cross-section of life in the country: the arts, social and public service, industry, nature, sport and adventure. Within these categories, men and women of all ages, who are citizens of the United Kingdom, are eligible. Academic or professional qualifications are not needed, but candidates must be able to convince the selection panel that they have the knowledge and initiative to make full use of a Fellowship, both while they are abroad and when they come back.

So far, 397 Churchill Fellows have been selected in 63 different categories (315 men and 82 women). They have travelled to most parts of the world. The average grant of about £1,500 covers all expenses for about three months. Last year, one of these was a member of the Society, and this year he visits the U.S.A. to study air pollution there at first hand.

The Trust funds, which were raised by public subscription under the chairmanship of the late Field Marshal Lord Alexander of Tunis, provide an annual income of about £155,000 of which 14% is spent on administration, 5% on advertising and 81% on the Fellowships.

The following categories for awards in 1971 will be of interest.

## *COMMUNICATIONS BETWEEN THE PUBLIC AND LOCAL GOVERNMENT*

How can communication be improved so that people are able to take a more effective part in Local Government? Anyone interested in questions such as 'Does your Council know what you want it to do?' 'Do you know what your Council has done?' has a chance to apply for a Fellowship and to see how other countries cope with this all-important subject.

## *PROTECTION OF THE NATURAL ENVIRONMENT*

All concerned with the prevention of pollution, with ensuring that essential redevelopment is in harmony with natural surroundings, with the preservation of our natural environment, have the chance to study developments overseas and to put what they learn to good effect on their return.

To obtain an application form, send your name and address **only** on a **postcard** to: Winston Churchill Memorial Trust, 10 Queen Street, Mayfair, London W1X 7PD.

Completed application forms must be returned before **6th November 1970**.

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## EXPORTING TO EUROPE

"Pro Aqua—Pro Vita"	Basle, Switzerland	8–12 June
"A Cleaner World"	Malmo, Sweden	13–22 August
"Conservation 71"	Milan, Italy	14–19 November

All the above are international exhibitions covering four environment problems—water, air, refuse and noise.

Further details of Joint Venture facilities at these exhibitions can be obtained from the:

**National Society for Clean Air**

**134-137 North St, Brighton BN1 1RG Tel: 26313**

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### **Chemical Control of the Human Environment IUPAC**

Plenary lectures presented at the International Symposium on the Chemical Control of the Human Environment, Johannesburg, July 1969.

Contents: Pest Control—A New Industrial Revolution. Chemical and Biochemical Implications of Human and Animal Exposure to Toxic Substances in Food. Chemistry and Control of Afloxin. Pesticide Residues in the total Environment: Reliable Determination and Detection, Mitigation and Legislative Control and Surveillance Programmes. The Public Health Hazards Associated with the Non-Medical and Animal Health Usage of Anti-microbial Drugs. Man's Control of Water Quality. The Treatment of the Air Pollution Problem within the chemical Industry of West Germany. Survey of the Dangers of the Chemical Age.

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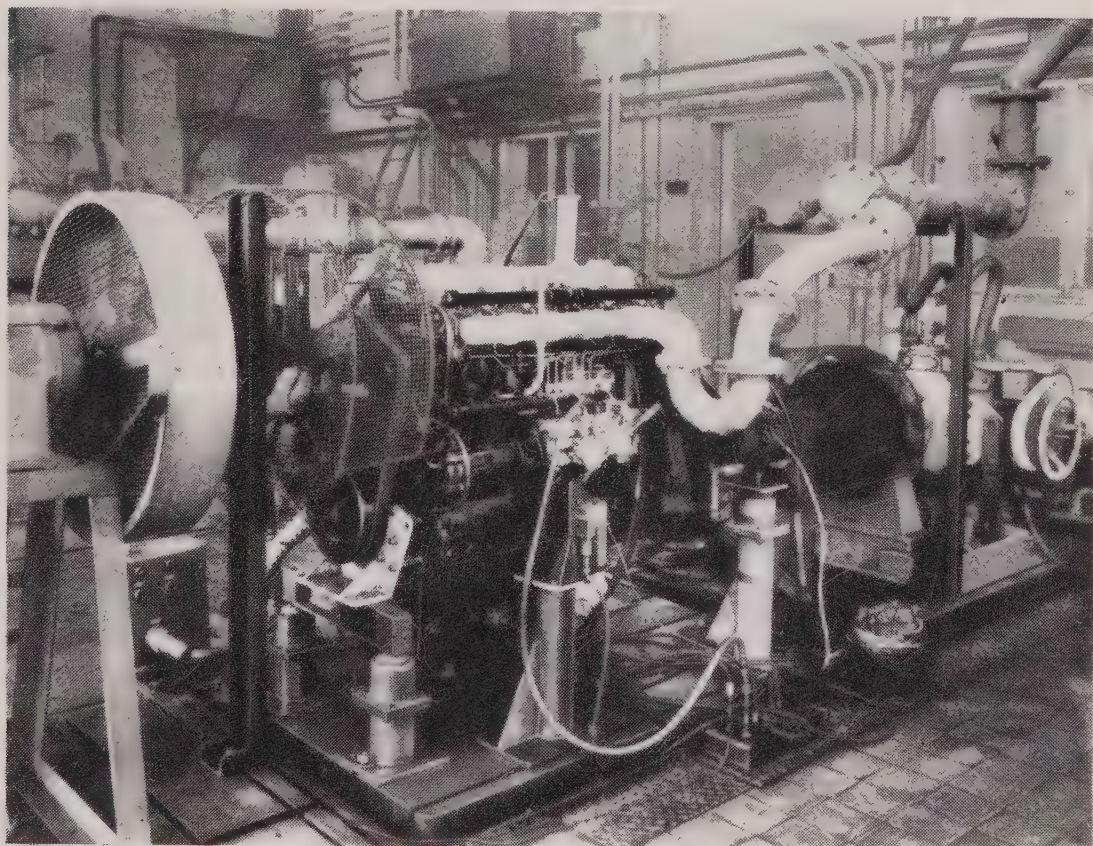


# INDUSTRIAL NEWS

## **DIESELS DESIGNED TO A SMOKE FREE STANDARD ROLLS-ROYCE THE FIRST MAKER TO MEET B.S. AU 141: 1967.**

When diesel engines smoke they emit soot particles, which naturally attract attention because they are visible—and are in any case unpleasant. They therefore attract undue public attention of an unwelcome kind. Throughout the world, then, much effort is being expended on making diesel smoke as unobtrusive as is practical and reasonable. A great spur to these efforts is represented by the specification of a smoke intensity limit in the British Standard method of rating engines. It is this standard which Rolls-Royce has attained with its own automotive diesel engines.

The world's first automotive diesel engine to pass the full requirements laid down in B.S. AU 141: 1967 is a Rolls-Royce. It is the new Mk. II version of the 12·17 litre six-cylinder Eagle 220.



The Eagle Mk II on the test-rig during the type test for B.S. AU 141: 1967.



At the Shrewsbury diesel engine works of Rolls-Royce Limited, a certificate was granted recently to the Company by the British Standards Institute, which, in 1967, set the toughest standard in the world for measuring diesel engine performance as applied to road vehicles.

What makes B.S. AU 141: 1967 so difficult to meet are the stringent limits set on exhaust smoke density. Other countries' standards for vehicle diesel engines do not impose precise limits on exhaust smoke.

Unlike all others, the British truck engine rating standard requires that the engine tested is chosen at random from a production batch, thus avoiding specially pre-tuned engines being submitted. The British Standard requires an engine to achieve its published power during a 100-hour endurance test alternating between hot, full-power and idling without developing a smoky exhaust.

Many engines have now had their powers reduced to meet the test conditions of the British Standard, but until now none have successfully completed the 100-hour test.

The Rolls-Royce Eagle 220 Mk II has not had to be derated from its previously published performance: improved breathing, increased combustion efficiency, and reduced internal friction have enabled the high power output to be maintained even when meeting the rigorous B.S. AU 141: 1967 standard. At the same time, the fuel consumption has been reduced.

By designing the new Eagle Mk II to meet B.S. AU 141: 1967 Rolls-Royce Limited has taken a practical step forward in reducing atmospheric pollution and nuisance to the public.

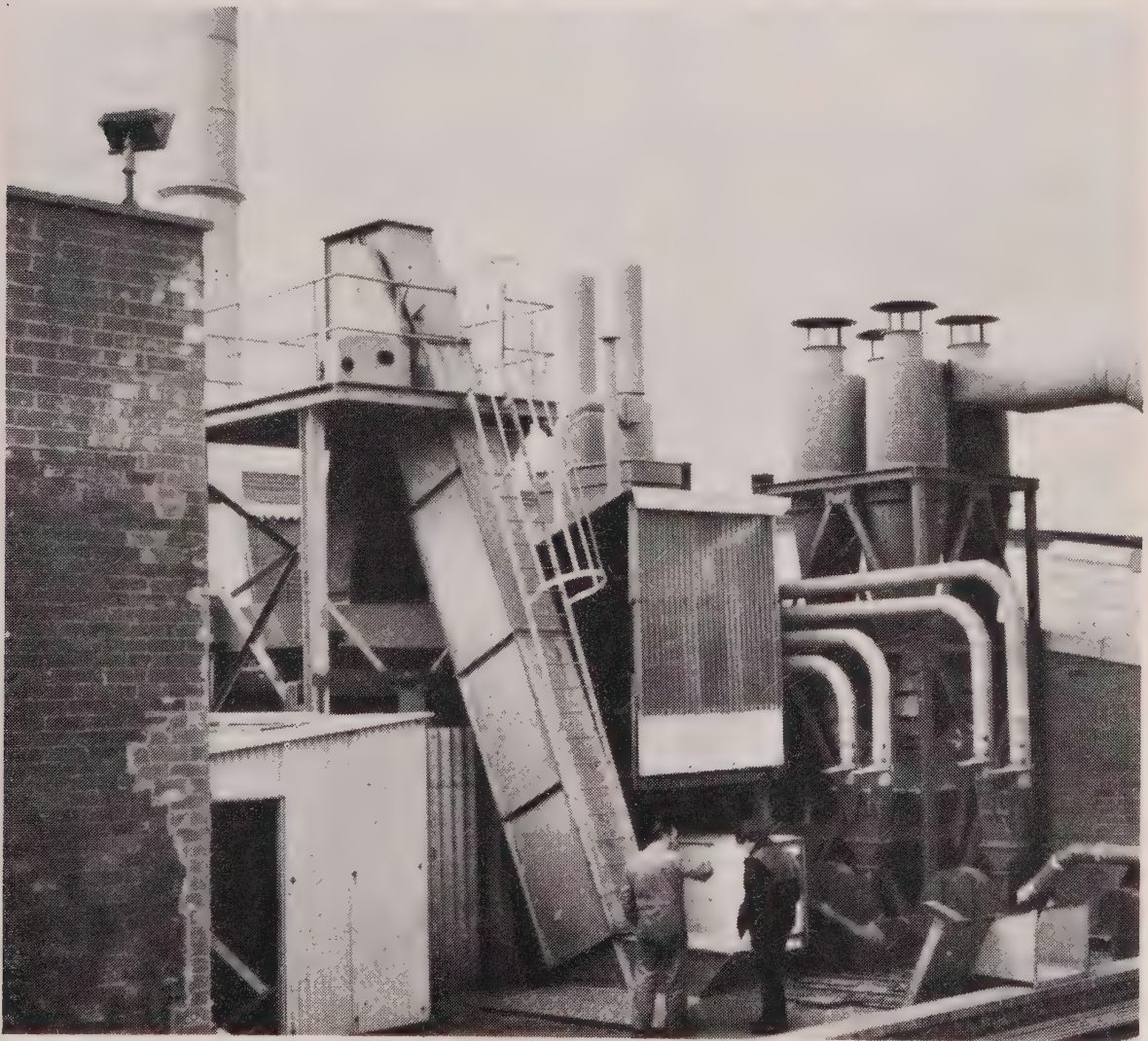


An operative taking readings from a Dunedin Smokemeter during the 100-hour endurance test which is part of B.S. AU 141: 1967.



## Getting Rid of Paper Dust by Incineration.

Linden Mill of Castleton, a branch factory of T.P.T. Ltd., spent 10 months researching methods of incinerating paper dust before placing an order for a complete automated plant with The Incinerator Company Ltd., 14 Coopers Row, Tower Hill, London, E.C.3. Other manufacturers said it could not be done, since such waste tends to be explosive. The plant has now been fully operational since July 1969, reducing to 2 per cent by volume up to 300 lb./hr. of paper dust as well as contaminated paper off-cuts and general factory waste. A 150 h.p. system of dust control automatically collects waste dust from process and manufacturing machinery. A gas burner is used consuming 700 ft.<sup>3</sup>/hr. of natural gas, and this heat coupled with the waste combustion gases is sufficient to raise 1,950 lb./hr. of steam. Provision for a waste heat boiler has therefore been made in the design, a possible installation being planned for a later date. When completed the total installation will yield a saving of about £1,500/year on 1968 prices. Supervision and operation requires the presence of one man for approximately four hours per day.



## FUMELESS REFINING AND POWDER INJECTION IN STEELMAKING

New process combines advantages of ore boiling and oxygen lancing

A new way of refining liquid steel has been developed in the laboratories of the Steel Castings Research and Trade Association, Sheffield, U.K. The process consists of injecting by a carrier gas a powdered metal oxide into a liquid steel bath to produce a carbon boil without the emission of brown fume which is associated with oxygen injection. Crushed millscale is very suitable because of its density and high content of iron oxide, but other powdered materials, including ore fines, can be used with equal success. Additionally, powders containing an oxide of a metal which is a constituent of the steel (e.g. Ni or Mo oxides) can also be used to achieve simultaneous alloying and refining. Compressed air is used as the carrier gas and the entrained powder is injected into the bath through a consumable lance, as when using oxygen injection. A powder dispenser incorporating an adjustable speed rotary valve has been developed and proved by extended trials, to give the required flexibility and control of the feed of powder into the carrier gas.

The oxide injection process has been approved by the Alkali Inspectorate as meeting the requirements regarding fume emissions during steelmaking and the process is now in use on many of the electric arc furnaces in the U.K., particularly in steel foundries.

The above process is the subject of Patent Applications in both the U.K. and overseas and the commercial marketing and exploitation of these inventions is being undertaken by the National Research Development Corporation with whom licences may be negotiated.

The technique of powder injection has been successfully extended by S.C.R.A.T.A. to include other aspects of refining and treatment of liquid ferrous metals, e.g. recarburisation, dephosphorisation, desulphurisation and deoxidation.

The Steel Castings Research and Trade Association is to hold a one-day Conference in Sheffield on 18 September, 1970, to review and discuss these new developments. Papers presented will cover development work by S.C.R.A.T.A. and production experiences on the use of powder injection.

*Further information regarding the Conference can be obtained by writing to:*

**The Technical Secretary,  
Steel Castings Research and Trade Association,  
5 East Bank Road,  
Sheffield, S2 3PT.**



## **New Booklet on London Research Station**

Research into making North Sea gas smell like gas is being carried out by London scientists. They work at the Gas Council's London Research Station in Fulham.

Some of the natural gas found off the east coast has no smell and chemicals are used to give it the same odour as traditional gas. For gas made from oil, also odourless, a chemical called tetrahydrothiophene has been commonly used. But this is less effective with natural gas and the search is on to find the best possible smelling agent.

The work on gas smell is described briefly in a new booklet about the London Research Station published by the Gas Council. One of four Gas Council research centres, the station works on projects ranging from pilot plant chemical engineering studies and computer controlled gas transmission and distribution to detailed study of elementary chemical and physical processes.

## **First Contract Announced for Cat-Ox System**

The Cat-Ox system developed by Monsanto Enviro-Chem Systems Incorporated of Chicago, and recently licensed to Simon-Carves Chemical Engineering Ltd. (Sim-Chem) of Stockport, has scored its first commercial success in the power generating industry of the U.S.A. The Illinois Power Company has announced that, subject to final approval by the Illinois Commerce Commission, they will install a "demonstration" Cat-Ox system on Number 4 generation unit of their Wood River Power Station.

## **Britain and U.S.A. Agreement on Air Pollution Research**

A second agreement between Great Britain and U.S.A. has been signed by Lord Robens, Chairman of the National Coal Board, and John T. Middleton, Commissioner of the National Air Pollution Control Administration, for further research work in connection with the fluidised bed combustion process. This agreement involves developing the potentiality of the process to reduce atmospheric pollution by sulphur and nitrous oxides.

Under the agreement the N.C.B. and N.A.P.C.A. will jointly finance a programme costing £¼ million (sterling) which will be put into effect immediately at the N.C.B. laboratories at Cheltenham and Leatherhead.

This is another step in building up an organisation which will exploit the process as the most up-to-date and economic method of coal firing applicable to power stations and other large industrial boiler installations.

Serious consideration is now being given to the building of the first large scale pilot unit at an N.C.B. power station at Grimethorpe.

## **New Harvey Leaflet**

Harvey Fabrication Limited, a member of the G. A. Harvey Group of Companies, have published a highly informative six-page leaflet on their range of Dust and Fume Collection Equipment.

The leaflet describes the four types of Harvey Torit Dust Collectors together with their ratings and dimensions. The accessories available with this equipment are illustrated for the first time.

The new leaflet also includes details of the Harvey 4-Branch Fume Dispersal Unit.

### **Wellman's £500,000 Contract for Foundry Plant**

Wellman announce the receipt of an order worth nearly £500,000 from the British Steel Corporation Stanton and Staveley Group, for a cupola melting plant at their works near Nottingham. When built, this will probably be the largest cupola installation in Europe.

This order was obtained by the Foundry Plant Division of Wellman Incandescent Furnace Co. Ltd., Cornwall Road, Smethwick. The plant comprises three liningless water-cooled cupolas (each with a melting rate of 43 tons per hour) *complete with dust arresters*, Whiting 'S' type stationary chargers and raw material mechanical handling equipment.

This order from the B.S.C. follows the successful commissioning of two 20-ton per hour liningless water-cooled cupolas at the Holwell Foundry at Stanton and Staveley at Melton Mowbray by Wellman Incandescent.

### **Beaumont Announce Contract**

F. E. Beaumont Limited have been awarded a contract valued at nearly £20,000 for the South Western Regional Hospital Board at Southmead Hospital, Bristol.

A 120 ft. high concrete wind-shield was built about five years ago with six 1 ft. 10 in. internal diameter inner brick chimney liners. These brick liners have collapsed due to attack by acidic condensation of the flue gases. The six brick liners are to be demolished and replaced with six new insulated Beauvent steel liners to prevent recurrence of failure.

The contract is urgent and has to be completed by the end of August 1970 so that this hospital has full boiler availability for the winter months.

### **GEC-Elliott Flue Gas Analyzers for CEGB**

Following months of evaluation in service by the Central Electricity Generating Board, GEC-Elliott flue gas analytical systems have been selected for four power stations. The equipments, which incorporate Junkalor analyzers, will be supplied by GEC-Elliott Process Instruments Limited—part of GEC-Elliott Automation.

### **New Kiln Burner Leaflet from Peabody**

Chemical and combustion engineers Peabody Limited, have published a new brochure detailing their range of kiln burners.

### **Announcement by Buell**

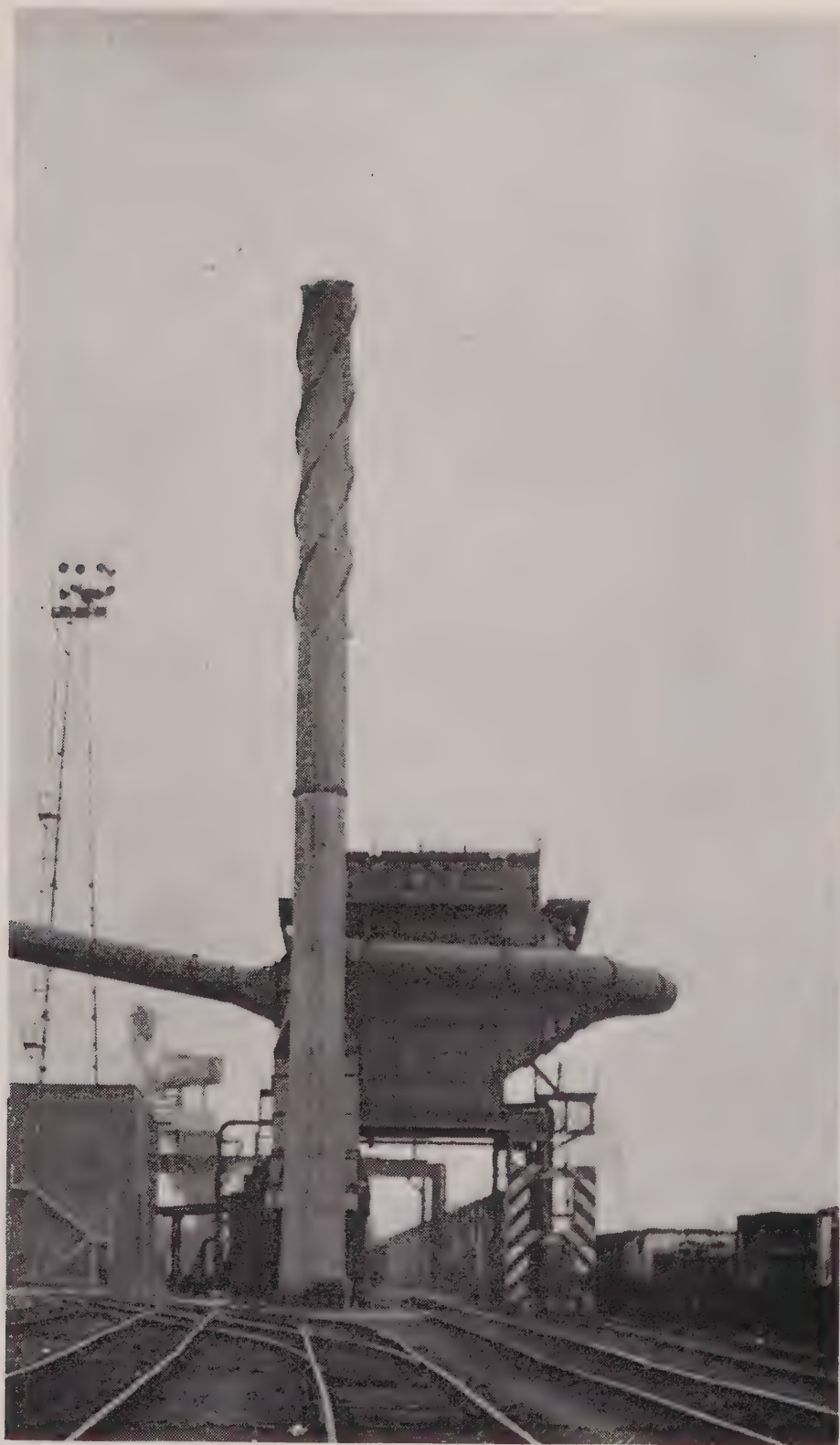
It has come to the notice of Buell Limited of Birmingham, a company of the Simon Engineering Group, that Ambuco Limited is attempting to draw the attention of customers and potential customers to a connection between Ambuco Limited and the name "Buell" and it is therefore necessary that the distinction between the products of the two companies should be made clear.

The design and expertise of Buell Limited for cyclones and certain other plant are based on work of Bureau Van Tongeren. The names Buell and Van Tongeren have been internationally associated with high efficiency cyclones but Ambuco Limited has never been directly connected with Bureau Van Tongeren or Buell Limited.

Collaboration between Bureau Van Tongeren and Buell Limited is being actively maintained and Buell Limited continues to be able to supply customers with products and services which have all the benefits of both the past and current Buell and Bureau Van Tongeren designs, knowledge, expertise and know-how.

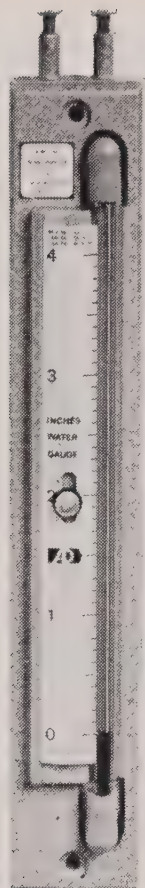


**£ $\frac{1}{4}$  million Extension to Fume Cleaning Plant at Templeborough  
Electric Melting Shop**



The first of six new chimneys has recently been erected at the back of Templeborough Electric Melting Shop, Rotherham Works, in British Steel Corporation's Special Steels Division, and from it can be seen

issuing a relatively small white steam plume. This is the first visible sign of the latest move in the battle for clean air at the world's largest electric steelmaking plant.



### **New Filter Loss Gauge**

A new inexpensive filter loss gauge has been produced by Airflow Developments Limited, High Wycombe, for use in industrial ventilating systems and warm air heating and air conditioning systems for measuring filters to determine the reduction in their efficiency through contamination. It is particularly important in certain industrial applications where the reduction in efficiency of the filters may cause health hazards.

### **A New Technical Bulletin**

A new Technical Bulletin entitled "Intermittent Firing—The Case for Gas-Tight Dampers," written by P. E. Jents, is now available from Metro-Flex Group of Companies.

### **Redfyre Contract Success**

The Redfyre Centramatic 40 oil-fired boiler has been selected by two new town development corporations as the "heart" of central oil storage domestic heating systems.

Contracts worth nearly £100,000 have been placed with Redfyre Limited, a member of the Newton Chambers Group, by development corporations at Skelmersdale, Lancashire, and Redditch, Worcestershire.

At Skelmersdale's Tanhouse housing development the Redfyre 40 Centramatic will go into 325 homes, and at Redditch, the Redfyre boiler will be installed in 520 homes on the Matchborough Bead development.

The contracts for Redditch and Skelmersdale have been placed by two of Redfyre's main distributors: Ward Bros. (Wolverhampton) Ltd., (Skelmersdale), and G. R. Francis Limited, of Birmingham (Redditch).

### **New Extensive Product Range for Harveys**

Harvey Fabrication Limited is developing further its work in the field of Industrial Dust Control Equipment through an Agreement made with Mr. R. Ashman, C.Eng., F.I., Mech.E., F.I.H.V.E., M.Inst.F., and RAED Limited of Surbiton, Surrey, for the manufacture and marketing of Reverse Pressure Filters, Heavy Duty Super Cyclones and Hydrocyclonic Gas Scrubbers in the United Kingdom.

This equipment is coupled to the range of unit Torit dust collectors already being marketed successfully in the U.K. and enables Harveys to offer a complete service including site erection and commissioning to this fast growing market.



## Breakthrough for Gas at North Wales Tile Manufacturers.

A technical breakthrough at a North Wales factory has cleared up a long standing smoke emission problem and pointed the way to a massive fuel switchover throughout the country.

The breakthrough is the highly successful conversion of kilns producing floor and other kinds of tiles to firing on North Sea gas at the Hafod tileri of Dennis Ruabon Ltd., in Denbighshire. Previously they used coal or oil which produced palls of black smoke at certain periods during the firing cycle.



Rectangular kilns in the foreground are on natural gas. In the background are unconverted kilns

Natural gas has eliminated the smoke completely. The switchover has also brought other economic benefits which add up to an improvement in kiln productivity of more than 55 per cent.

It was, however, the smoke problem that made Dennis Ruabon call in the Wales Gas Board. The Board were so confident of success that they undertook to pay the cost of converting the first kiln in the event of failure.

Success was more complete than even the Board hoped. Since other firms in the heavy clay industry are also faced with meeting much tighter government requirements on smoke emission, work in North Wales together with work in allied fields is expected to pave the way for a widespread changeover to natural gas.

Gas has also vastly increased the quality of the tiles. Previously the percentage of first quality finished tiles was about 70. Now it is more than 90.

The laborious processes of setting, lighting, stoking and cleaning coal-fired kilns has of course been vastly reduced.

Dennis Ruabon is the U.K.'s leading producer of floor quarry tiles. The acid and corrosive resistant tiles have a variety of uses in industry but are also found in telephone exchanges, universities, embassies and public buildings. A large proportion of total output is exported—particularly to North America.

### **Izal's Free on Loan Promotion**

Izal Limited, a member of the Newton Chambers Group, has launched a "Free on Loan" air conditioning unit service to its customers in the industrial, commercial and public authority fields.

With every one dozen packs of Airkem Solidaire Gels, Izal customers are being offered a wall-mounted dispensing unit—without charge.

### **Gas Council's Capital Development Programme**

The progress being made towards a British gas industry based almost entirely on natural gas is described in a new Gas Council publication, "Natural Gas in the Seventies". This coincides with the laying of an Order by the Minister of Technology to increase the industry's borrowing powers by a further £500 million to finance the capital programme necessary to give Britain's homes and industries the benefits of natural gas as rapidly as it can be exploited.

### **Infra-Red Gas Analyser**

A wide range of industrial gases can be analysed and continuously monitored by the URAS 2 infra-red gas analyser which has applications in process control, monitoring flue gases, air pollution studies, checking motor vehicle exhaust gases and in a special design for medical applications.

Hartmann and Braun (U.K.) Ltd.,  
967 Harrow Road, Wembley,  
Middlesex.

### **Pollution Courses at University of Bristol**

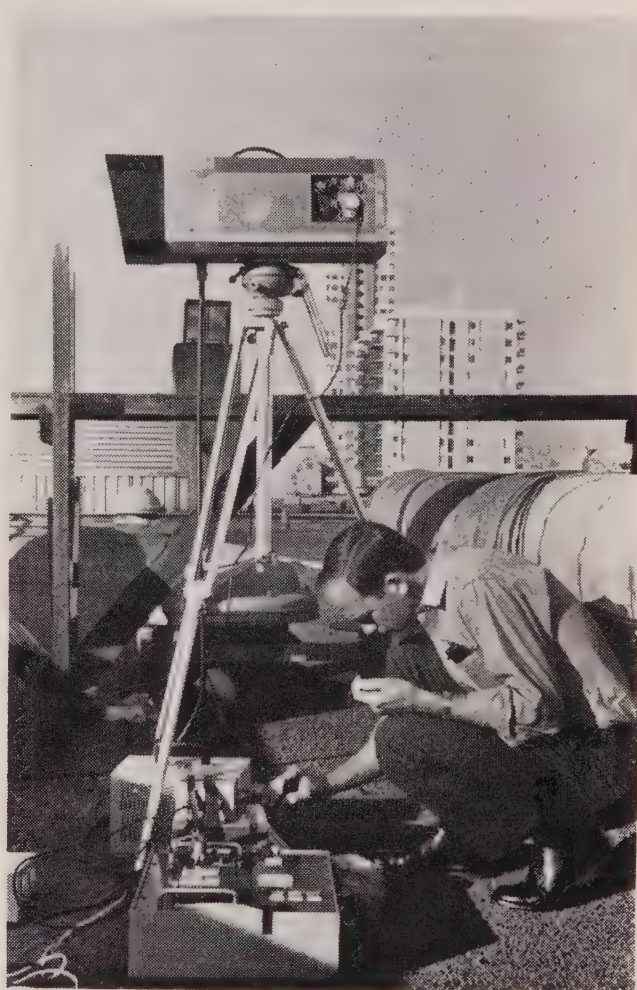
The University of Bristol are holding three linked weekend courses on Pollution on the 24/25 October, 14/15 November and 5/6 December, 1970.

The first weekend will deal with the Economic and Legal Aspects of Pollution, the second with Industrial and Urban Pollution and the third with Agricultural Pollution.



## Gaseous Pollution Measured Over Long-Lines

### New Atmospheric Analysis give Average Content Quickly at a Low Cost



A new method of monitoring air pollution which provides instantaneous, continuous and unattended chemical analyses has been announced by Barringer Research Inc., a Canadian-based U.S. research company.

Described as a 'long-line' technique, the system uses a remote sensing correlation spectrometer to measure the average concentration of specific gases over spans as long as one kilometer, as opposed to the limited coverage of suction-type systems which measure the pollution effect at only one point in the environment.

Minute amounts of gas, on the order of a few parts per billion, can be detected. The output can be either an analog chart record or in digitized form for computer processing.

Because it views over a distance, the long-line monitor gives a more representative value for estimating regional pollution content. The utilization of technical and scientific manpower also is improved with the elimination of a dependence on wet chemistry—a factor of significance to budget conscious atmospheric control agencies.



## **Hoccom Developments Ltd., of Bridgnorth, Introduce Three New Units**

Hoccom Developments Limited, of Bridgnorth, Shropshire, manufacturers of the Filtermist industrial air filters, have introduced three new units—a vertical discharge F.10 and vertical and horizontal discharge F.16 units. These have been developed after considerable research to meet the special requirements of many customers.

The original F.10 horizontal unit is still being manufactured but the new models extend the range to meet customers' requirements. The F.16 with its greater throughput allows, in some cases, two machines tools to be fitted to one unit.

The Filtermist is claimed to go a long way towards solving the problems of oil laden air in machine shops. Oil pollution of this type can be a serious health hazard to operators. It is also a fire hazard and greatly increases house-keeping costs. The highly efficient Filtermist units, which are self-cleaning and thereby virtually maintenance-free, improve the atmosphere within seconds of going into operation.

## **Silent Steam Humidifier The Portable Casana Vapor**

The compact, attractively styled Casana Vapor manufactured by Air Improvement Services, provides efficient, clean and odourless humidification in complete silence. It has no motor or moving parts and produces practically invisible steam at up to 1 pint per hour. Specially developed and completely enclosed circular heating elements heat the water evenly until evaporation occurs, when the silent steam rises slowly for instant absorption by the ambient air, without causing evaporative cooling and heat loss.

## **Izal Increases Odour Counteractant Sales**

Sales of the odour counteractants to industry by Izal Limited—a member of the Newton Chambers Group—are on the increase.

Mr. Richard Brown, managing director of Izal, told a sales conference that sales of odour counteractants are accelerating as the community and industrial managements become increasingly aware of the need for improving our environment.

Mr. Brown explained that many industries were becoming more and more conscious that manufacturing processes often create odour problems and the correct application of counteractants not only removes the malodour but leaves behind a fresh air effect which improves the environment.

## **Westinghouse Forms Ecological Systems Department**

The Westinghouse Research Laboratories has formed an ecological systems department to co-ordinate and expand its studies of technology that directly affects the environment.

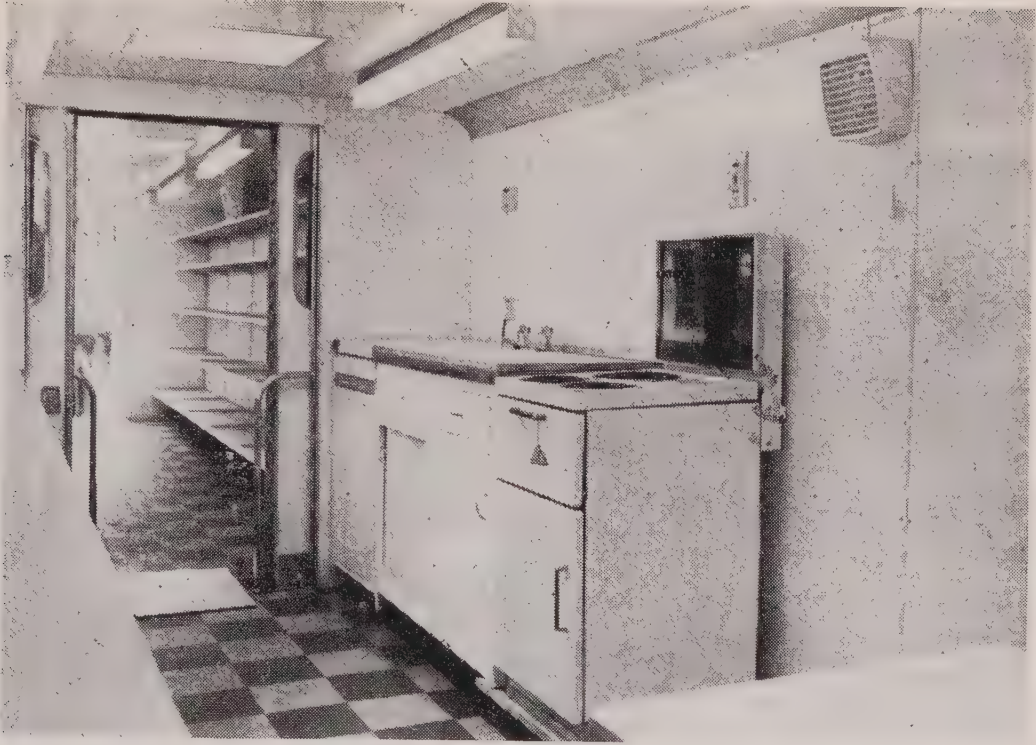
Typical of projects in the new department are the search for better ways to control smoke and gases emitted by industrial facilities, and development of new techniques for municipal sewage and solid waste treatment plants.

It will bring together related projects and form the basis for broadening and intensifying Westinghouse's programme on the processes that can alter man's air and water surroundings.

The ecological systems department is part of the energy systems directorate headed by Dr. Daniel Berg.



## Extractor Fans in Mobile Dairy Sales Unit for Austria



A mobile shop, 35 feet long, to dispense milk products for one of Austria's major dairy complexes has just left this country with four Xpelair GXC 6 extractor fans providing ventilation.

The mobile unit is designed for speedy conversion into a 'self-contained dairy shop. Built by Locomotors Limited of Mitcham, it will

be used at fairs, festivals and outdoor exhibitions.

A spokesman for Locomotors Limited said that a mobile unit of this type must have perfect ventilation especially with dairy products, which need to be kept in a cool temperature and the extractor fans create an air flow throughout the shop.

## Clean Air Conference

1971

Folkestone

19-22 October

## Southerngas Air Conditioning Seminar for Post Office Chiefs



The Post Office's particular requirements in air-conditioning—and the gas industry's ability to provide the fuel and equipment to meet those needs—were the subject of a one-day seminar staged by Southerngas.

Among over 20 top officials present from the Post Office were Mr. C. A. Conn, senior executive engineer, Telecommunications, South Western Region, and three executive engineers from the South Eastern Region, Mr. P. J. O'Doherty

(Postal), Mr. A. J. Clarke and Mr. G. A. Butler (Telecommunications).

They were welcomed by Mr. Bob Nutt, commercial marketing officer with Southerngas, who outlined the benefits of special North Sea gas contracts.

The seminar ended with visits to two air conditioning installations—one at the Royal South Hants Hospital, Southampton, and the other in the computer department of the Board's Winchester Road, Southampton, offices.



## **Gas Council Geared Up for Boiler Changeover**

At the end of June, Area Gas Boards reported that since January, 1970, orders had been placed for the changeover of more than 4,000 boilers from coke to gas. These contracts represent a total annual gas load of 40 million therms, which will displace an estimated 168,000 tons of coke.

The majority of these contracts are for the changeovers to gas of heating systems in schools, other local authority establishments and hospitals, although a proportion do concern buildings in the private sector such as hotels, restaurants and office blocks.

The current extensive programme of boiler changeover is being co-ordinated, at national level, by the Gas Council, which has established close liaison with manufacturers and contractors.

Gas cannot be regarded merely as a substitute for the solid smokeless fuel it is replacing. A switch to gas brings with it very significant bonuses. Gas is not only smokeless, but its combustion produces virtually none of the sulphur dioxide recently described by Dr. Frank Taylor, a consultant heating engineer, as the biggest single air pollution problem facing our cities today. The cleanliness of gas eliminates the need for high chimneys and complicated filtering devices and reduces maintenance costs on equipment. Also, gas does not mean that the user has to forfeit valuable space for fuel storage and delivery.

The benefits of switching to gas are discussed and illustrated graphically in a publication just issued by the Gas Council. "Share in the Riches of Britain's Gas: Benefit from Boiler Changeover" is the

message of this new leaflet, which follows the publication earlier this year of a 40 page technical manual on boiler changeover.

## **Hocom Developments Ltd. win £10,000 Order**

A Bridgnorth, Shropshire, company, formed less than a year ago, has won what is thought to be one of the biggest orders yet placed for an industrial oil mist filtration scheme.

The order, which was obtained in the face of tough competition, is for 61 Filtermist units for the Swansea Works of the Ford Motor Company Limited, and is worth more than £10,000. The order has been placed with Hocom Developments Ltd., of The Stanmore Industrial Estate, Bridgnorth.

The units, known as the Filtermist F.16, will be fitted to machine tools at Swansea to remove oil mist from the air.

Some aspects of the F.16 vertical units were specially designed to meet the requirements of the Ford Motor Company, which, with the installation of these machines, will lead the way in doing everything possible to provide healthy working conditions for machine operators.

## **Beaumont's New Publication**

Available now from F. E. Beaumont Limited, is a new publication No. 704, describing their range of industrial steel chimneys.

## **Boiler Operator Training Scheme**

Combustion Engineering Association in participation with the College of Fuel Technology is now equipped and staffed to provide training for Boiler Operators.

## Electric Vehicle Industry in U.K. is Making Very Heathly Progress.

From the annual report of the Electric Vehicle Association we learn that the approximate number of industrial trucks manufactured in 1969 was 13,100 as compared with 11,400 during the previous year. This shows an increase of 15 per cent. Even more impressive are the figures for exports because of the total number of industrial trucks manufactured 4,750 were sent overseas as against 3,550 during 1968—which represents an increase of no less than 34 per cent.

Turning to battery electric road vehicles we note that in 1969 a total of 3,380 new units was registered by the Ministry of Transport for use on the public highway and the comparative figure for the previous year was 3,174. However, it should be noted that these figures include industrial vehicles licensed as such but do not include those vehicles used in hospital or industrial service on private property. Appreciation is expressed of the valuable financial assistance and other services provided during the year by the Electricity Council and its Marketing Department.

## Onslaught on Pollution.

This year, 1970, perhaps marks the timing of the greatest onslaught so far on pollution, and atmospheric pollution is one of the greatest of these evils. Moreover in reducing this menace to the minimum one of the largest contributions can come from the extended use of battery electric vehicles by all branches of industry and commerce. Already a great deal has been achieved—especially in the dairy trade where something like 80 per cent of all retails deliveries are by electric vehicles.

An extension of this usage in the bakery trade, docks, airports, hospitals, railways, municipal undertakings and other branches of industry, will not only make a valuable contribution in resolving the problem of pollution but will also bring added bonuses in the form of much less noise and greatly reduced maintenance and running cost.

---

### Two New Appointments for Nu-Way Benson

The West Bromwich company, Nu-Way Benson (Heating and Drying) Limited, a member of the Wolsley Hughes Group, has appointed Mr. Paul Yunnice to Assistant Sales Manager.

Replacing Mr. Yunnice, as Midlands and South Wales technical representative, is Mr. Michael Cheeseman, formerly sales administrator for Nu-Way Benson.

### Honorary Degree for BSI's Deputy Director General

Mr. G. B. R. Feilden, C.B.E., F.R.S., deputy director general of B.S.I.—and the man who will become director general in September with the retirement of Mr. H. A. R. Binney, C.B.—was awarded the honorary degree of Doctor of Technology at a graduation ceremony at Loughborough University of Technology on 10 July.



## **Electric Domestic Appliance Sales Show Improvement**

Sales of electric cookers and washing machines through Electricity Board shops in the first quarter of 1970, showed encouraging improvement over the similar period of the previous year. Cooker sales were up by 13.5 per cent and washing machines by 12.2 per cent.

These figures indicate some growth in customer spending on electric appliances which had been affected by the general deflationary trends of last year.

Refrigerators did not appear to be as much affected by the credit restriction as other major appliances and their growth of sales continued. Electric clothes dryers and immersion water heaters also showed small increased sales.

Sales of electric storage radiators in common with all forms of home heating dropped very slightly. However, according to AGB Home Audit's survey during the same period, more electric central heating was installed than any other system. Storage radiators, AGB state, were easily the best selling individual system.

Over the twelve months ended March 1970, sales of nearly all electric domestic appliances were up on the corresponding period of the previous year.

## **New Assistant Director Appointed at Gas Council Engineering Research Station**

The Gas Council announce the appointment of Dr. W. L. Mercer, B.Sc., Ph.D., C.Eng., M.I.Gas E., A.I.M., as Assistant Director of their Engineering Research Station, Newcastle upon Tyne. Dr. Mercer was previously Manager of the Research Division at this Station.

## **Expansion at Bigwood**

Bigwood Dust Control Ltd., designers and manufacturers of dust control and suppression equipment, is widening its activities to take in the production of effluent treatment systems.

Already plants for dealing with plating effluents have been installed at the works of two manufacturers of automobile components.

Now a leading car manufacturer has ordered conditioning equipment for zinc phosphate and electrocoat paint lines.

Mr. David Roberts, general manager of Bigwood Dust Control, said the new orders could be "the tip of the iceberg".

With world attention focused on pollution problems—symbolised by the Government's decision to co-ordinate its pollution research programme—he expected a growing pressure for the installation of dust control and effluent treatment equipment.

## **Radiation Appoint New Managing Director**

Radiation Limited announce the appointment of Mr. R. Kettling as Managing Director of Ascot Gas Water Heaters Limited, with effect from 1 June 1970. Until now Mr. Kettling was Works Director of Ascots.

## **New Chairman Appointed for The Boiler and Radiator Manufacturers' Association**

Mr. J. K. Smith, chairman and managing director of the Beeston Boiler Company Ltd., has been appointed chairman of the Boiler and Radiator Manufacturers' Association.

### **Cleveland Potash Contract for Head Wrightson Iron Foundries**

Head Wrightson have been awarded a major contract, valued at approximately £1m. for the supply of shaft linings for the new Cleveland Potash Mine currently being constructed at Boulby, North Yorkshire.

The order, to be shared by Head Wrightson Iron Foundries Limited and the Stanton and Staveley Division of the British Steel Corporation, has been placed by the Mine Construction Consortium,

whose members are Thyssen (G.B.) Limited, Shaft Sinkers (Pty.) Limited and Taylor Woodrow Construction Limited. It will entail the production of approximately 8,000 tons of high grade cast iron and ductile iron, which will provide a total of 2,200 tubbing segments. These will form the lining of the mine shaft through the water bearing bunter sandstone strata encountered deep underground.

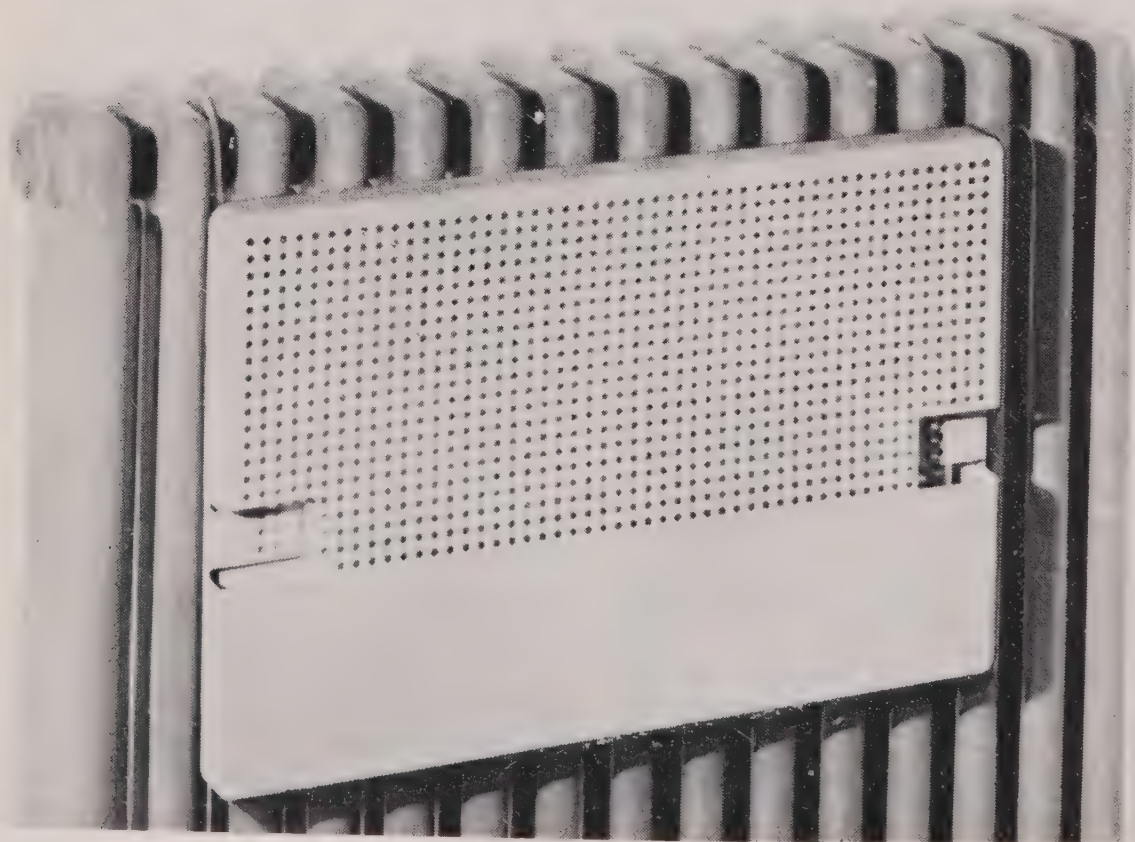
First deliveries of the segments will begin by the end of 1970, and the order will be completed in 1971.

### **Hang On Radiator Humidifier**

The Casana hang on Radiator Humidifier, manufactured by Air Improvement Services Limited, as shown on the photograph, performs its main function, namely to evaporate as much water in the form of vapour per square inch of its surface as is physically possible without any moving parts or power

sources such as motor or electricity.

In fact it evaporates its full water contents of 3 pints every day. This is not usually achieved with this type of Humidifier and careful attention had to be given to its design and in particular in respect of the make-up of the inserted evaporation pad.





## A New Range of Electric Delivery Vehicles



Harbilt's bright new "Dairy-Liner" striking the pattern for the electric delivery vehicles of the future. Available with either 24 or 36 cell batteries, the Harbilt has a range of up to 50 miles and speeds from 14 to 22 m.p.h.

---

"The Quality of Life and the Environment" is the title of a series of Saturday afternoon day schools organised by the University of Birmingham Department of Extra-Mural Studies.

September 26 — Problems Before Planners.

November 28 — Biological, Economic and Chemical Aspects of Water Pollution.

January 16 — Noise.

February 13 — The Control of Air Pollution: Smoke and Road Vehicle Emissions.

## **New Publications**

### **THE LAW RELATING TO AIR POLLUTION**

Compiled by F. Reynolds, F.R.S.A. M.A. P.H.I. M.Inst.F.

**price 3s (15p)**

### **TOWARDS CLEANER AIR**

A Survey of Air Pollution (Illustrated)

By Rear Admiral P. G. Sharp, C.B., D.S.C.

**price 3s (15p)**

### **CLEAN AIR NOTES FOR TEACHERS**

(revised edition)

**price 5s (25p)**

### **CLEAN AIR WALL CHART**

(For use with "Clean Air Notes for Teachers")

**price 3s (15p)**

### **CLEAN AIR YEAR BOOK 1970-71**

**price 10s (50p)**

*Available from :*

**NATIONAL SOCIETY FOR CLEAN AIR**

**134-137 NORTH STREET**

**BRIGHTON BN1 1RG**





***“They’re burning  
50 tons of waste  
per day down there!”***



***“Well where’s the smoke?”***



***“And where’s the smell?”***



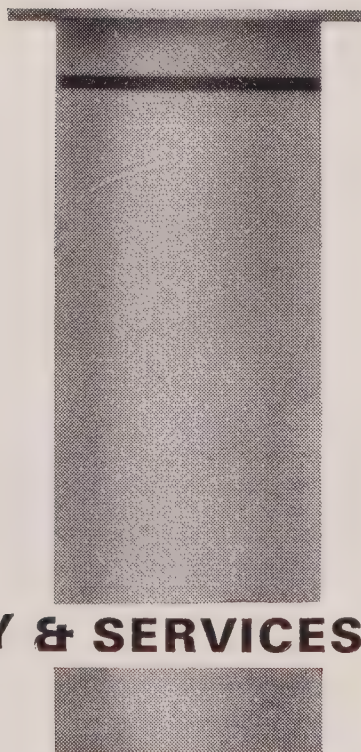
### ***There isn’t any!***

The Universal system of incineration ensures complete combustion of all waste materials. Sealed flame, three stage combustion with complete air control to all stages eliminates air pollution emissions, without smell, smoke or fly ash. Refuse reduced to 5% clean, dry sterile ash with a low fuel bill. Universal incinerators are efficient, compact, precision engineered units complete with a stainless steel stack of only 30'. In addition, the incinerator is designed to dispose of bulk refuse through the front opening on a refractorised trolley taking articles of up to 6' x 4' x 8'.

*Details of complete Municipal Turn-Key Projects are available on request.*

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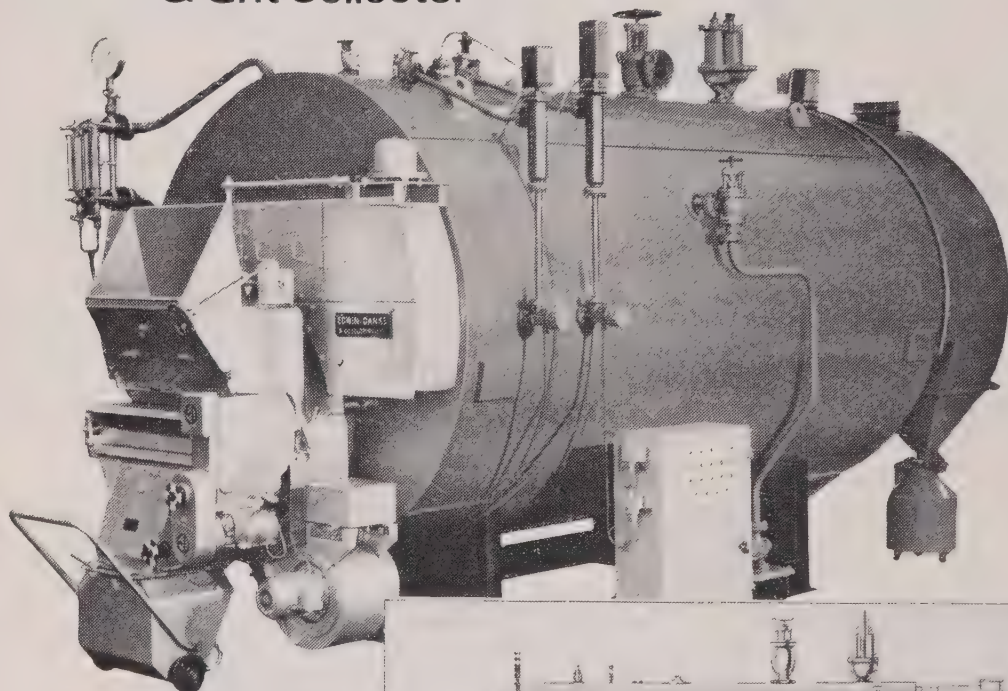
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Ring Road, Beeston, Leeds 11.  
Tel: Leeds 73761 (10 Lines)



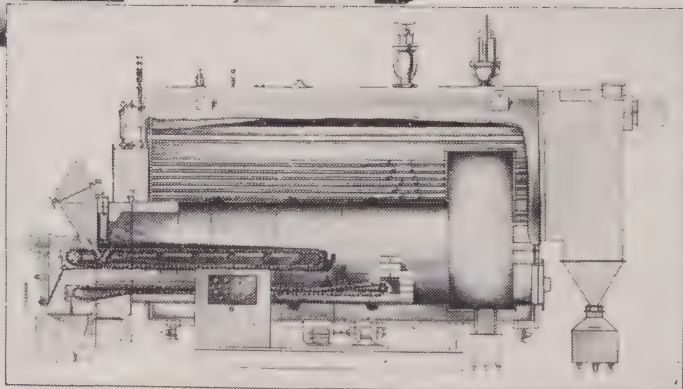
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STEAM OR HOT WATER

Treble pass Wet Back  
fitted with 'Oldbury' Chain Grate Stoker,  
Ash Extractor, Handimatic Combustion Control  
Integral Induced Draught Fan  
& Grit Collector



*... also available with  
SPREADER STOKER  
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from **sager**

*Illustrations showing the MH 4  
in an office and in the home*

The Knightsbridge range of heaters have been designed for incorporation within a normal building structure. Alternatively, installations for internal walls of breeze block structure require a surface mounted surround.

Cleanline the modern range of bathroom, hall, and bedroom heaters.

PRICE RANGE FROM  
**£14-11-7 — £20-0-0**

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HUGGINS LANE, WELHAM GREEN, NEAR HATFIELD, HERTS.  
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# **REXCO**

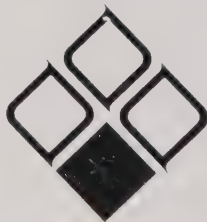
## **A Pioneer in Clean Air.**

The Rexco Group of Companies have been contributing to Britain's Clean Air since 1935.

Since the mid 'fifties' a massive programme of investment in plant and distribution facilities has led to a ten-fold increase in turnover—today running at some £6 million a year, and increasing still.

Manufacturing facilities at key mining locations in England and Scotland.

Rexco looks forward to the day when smoke is a thing of the past—and the Rexco Group of Companies will be proud to have been pioneers in the process.



**The Rexco Group of Companies**

Including Midland Rexco Ltd, Scottish Rexco Ltd,  
NCC Plant & Transport Ltd, NCC Engineers Ltd.

**National Carbonising Company Ltd.**  
**Mansfield, Notts.**



# SMOKELESS AIR

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JOURNAL OF THE NATIONAL SOCIETY FOR CLEAN AIR

No. 156

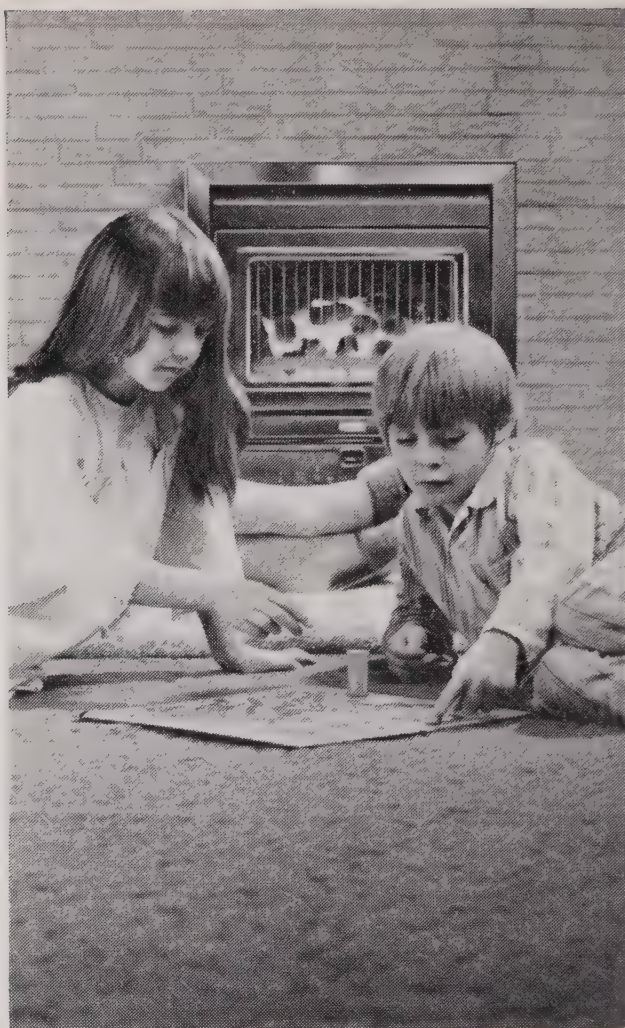
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WINTER 1970

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of enjoying  
clean air**



**Here's the  
warm-  
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Only solid smokeless fuel gives you the cheerful glow of a real fire, *plus* clean air, constant hot water and full or partial central heating.

What more could you ask of a modern heating system? Today's new fires and roomheaters can be fitted with powerful back boilers to give you all the benefits of central heating at its most efficient, whilst allowing you to keep the traditional comfort of a living fire in your hearth.

**Welcome home to a living fire**

Issued by the National Coal Board



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***What does it offer?***

**Buellability produces more efficient plant with operational savings for your dust collection and powder classifying. In these fields Buell specialise in designing, supplying, erecting and commissioning plant to suit individual requirements. Testing station and laboratory facilities are available. Do you need Buellability?**



**DUST COLLECTION · POWDER CLASSIFIERS  
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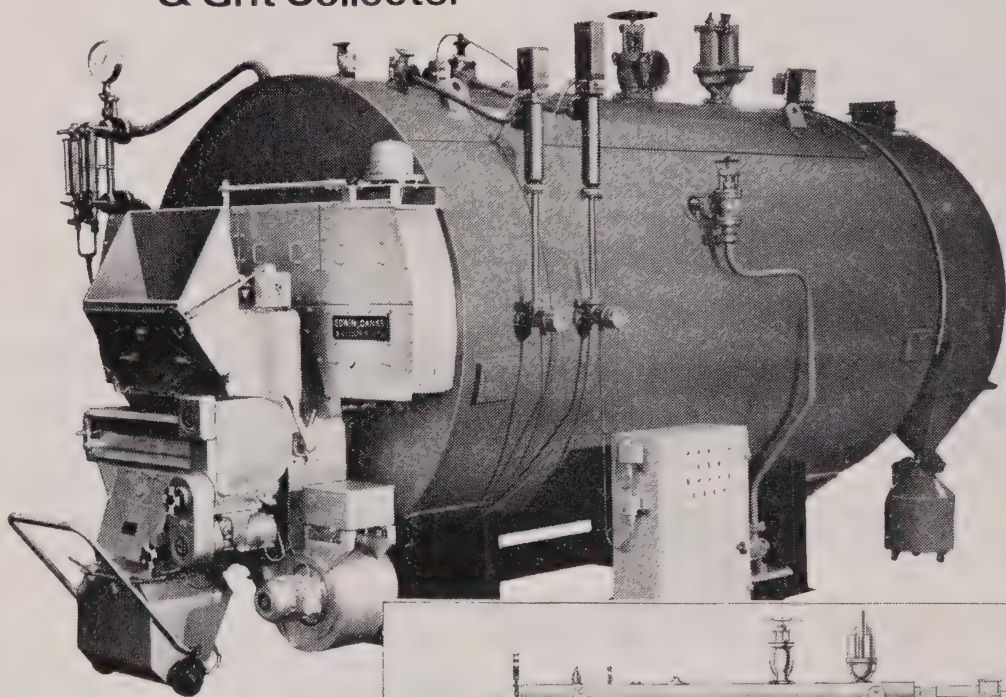


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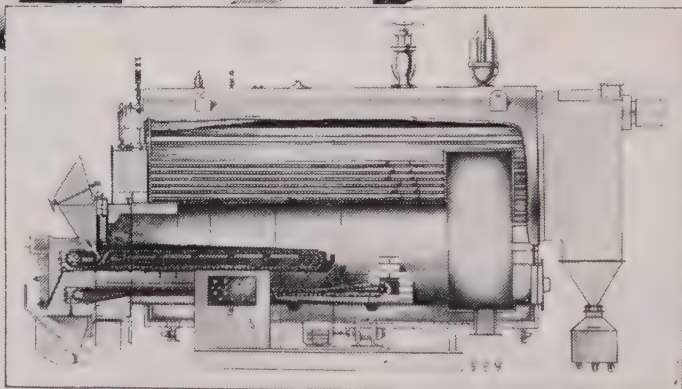
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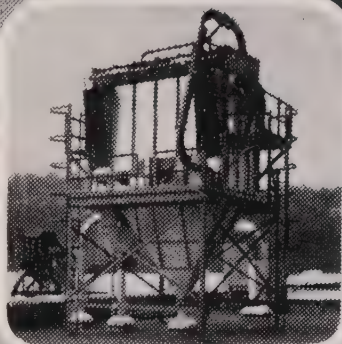
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# SMOKELESS AIR

Vol. XL No. 156

Winter 1970

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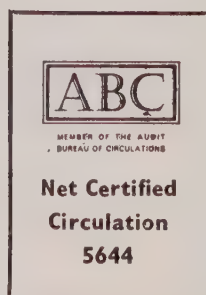
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*Ships, towers, domes, theatres, and temples lie  
Open unto the fields, and to the sky:  
All bright and glittering in the smokeless air*

# SMOKELESS AIR

## *A Department of the Environment*

We are sure that all our readers will welcome the recent announcement of the setting up of a Department of the Environment under Mr. Peter Walker. We understand that Mr. Walker intends to concern himself chiefly with "strategic issues of policy and priority". He will also take personal charge of the department's co-ordinating role on environmental pollution.

Mr. Eldon Griffiths, formerly the Joint Parliamentary Secretary to the Ministry of Housing and Local Government while assisting Mr. Peyton the Minister for transport industries will also have the special responsibility of helping Mr. Walker in the co-ordination of the work on environmental pollution, especially air and noise control.

Mr. Peter Walker has laid down the four priority objectives for his new department. They are a reform of housing finance, local government, planning and a drive to make the polluter pay for pollution. Mr. Walker recently said that for the first time subjects as diverse as road planning, local government, housing, building and construction—and conservation—were coming together under an integrated team. They would come under central direction "as part of an overall pattern. A pattern which affects all our lives—and those of the generations that follow".

On pollution Mr. Walker said "I am firmly of the view that those who pollute must pay for it. Whether it be at sea, in the air, on the land—or, shall we say, in the eye. The fact that we are today so much aware of the problems of conservation does give us a much better chance of beating the problems of the 20th Century 'wastemakers'."

Smokeless Air takes this opportunity of wishing every success to the new department and expresses the hope that real progress based on sound planning, may emerge for the future.

## *Tax Relief for Pollution Control?*

A small leaflet recently received from a company of photo-engravers in Birmingham gave details of the steps they take to avoid polluting the atmosphere. They quite rightly point out that one of the snags of anti-pollution efforts is that the less public-spirited firms who do not take reasonable measures have a cost advantage over those that do. They suggest some form of tax relief should be available to firms when they have specifically incurred expense in anti-pollution measures. An interesting thought to be passed on to the Chancellor of the Exchequer?

## *The Conference*

Later in this issue we publish a further report of the Conference. This year some of the innovations tried out at Eastbourne in 1969 have been continued. Slides were used to illustrate what speakers had to say and this does seem to have been successful. An Open Session was held on the Wednesday afternoon and this certainly drew a large audience from a considerable area round Southport. Though slow to start, the question period after the talks created considerable interest; had time allowed there is little doubt that this question period would have continued for some time.

At the informal gathering on the Monday evening, through the courtesy of Shell Mex & B.P. Ltd., delegates were able to see the new film "Environment in the Balance". The film, which was introduced in a few minutes talk by Mr. McCarthy, ran for about half an hour. This timing, we think is about right. Delegates still had plenty of time to move around and meet their friends and acquaintances.

This year, in spite of the inclement weather it was possible to run a small Tennis Tournament and this will be continued in future years. Next year it is planned to go back to the pattern of previous years whereby the Wednesday afternoon will be kept free for technical visits, golf, tennis or other activities. This year technical visits were held concurrently with Conference sessions and this does not seem to have been a very good thing as there was naturally a clash of interests.

## *A New Journal for the Society*

Spring 1971 will see the first issue of "Clean Air", the Society's new journal. It will be published in the new A4 size. This will give a type area of 10" by 7" on a page size of 11 <sup>11</sup>/<sub>16</sub>" by 8 <sup>1</sup>/<sub>4</sub>". This is the size now used for most technical journals and it is felt that the new format will have a greater appeal to all concerned. Because of the greater flexibility this size of page gives in layout, it will enable a more attractive publication to be produced which we hope that all our readers will like.

In this new issue a Reader Enquiry Service covering both editorial and advertising items will be introduced. This should also help to stimulate interest from both readers and advertisers.



# Trainex for Clean Air

The first Clean Air Exhibition by train will open on 24 May, 1971, and will last until 25 June.

The Clean Air mobile exhibition is a six coach special, designed exclusively for exhibition purposes. The coaches accommodate approximately 20 leading exhibitors. Fifteen major cities will be visited taking the exhibition straight to the customer for one or two days.

A heavily concentrated public relations campaign by the Society will be supported by trade and industrial advertising just prior to the opening of Trainex for Clean Air. The train will be prominently located in each city station and the platform will be well sign-posted and publicised by display boards and banners.

The itinerary of Trainex is: Leave Brighton on 24 May, London 25 and 26 May, Newport 27 May, Gloucester 28 May, Birmingham 1 and 2 June, Manchester 3 and 4 June, Liverpool 7 and 8 June, Glasgow 9 and 10 June, Edinburgh 11 June, Newcastle 14 and 15 June, Middlesbrough 16 June, Leeds 17 and 18 June, Sheffield 21 and 22 June, Derby 23 June, Cambridge 24 June and London 25 June.

A brochure for potential exhibitors giving the full details may be obtained from the Society's offices in Brighton.

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## The Quality of Life and the Environment

Is the title of a series of Saturday afternoon day school programmes to be held at the Department of Mechanical Engineering, University of Birmingham. On 13 February, 1971, at 2.15 p.m. The speakers will be Mr. F. Reynolds, Chief Air Pollution Officer, City of Birmingham, and Mr. J. P. Soltan of Joseph Lucas Ltd., and the subjects will be The Control of Air Pollution and Smoke and Road Vehicle Emissions.

Other subjects in the series are Water Pollution, on 28 November, 1970, and Noise, on 16 January, 1971.

## Clean Air Year Book—Errata

Table 3 on page 66 giving the estimates of pollutants from road vehicles in the United Kingdom in 1968 in million tonnes. The figure for Hydrocarbons under the heading "Diesel Engines" should be "0.018" not "0.18."

## Autumn Issue—Errata

The Autumn issue 1970 of Smokeless Air should have been Vol. XL, No. 155.

# SOUTHPORT CONFERENCE

The Society's Annual Conference at Southport in October showed a slight increase in attendance over the previous year and was considered by all who attended to have been a success. There can be no doubt that the papers presented were not only of a high order, but also stimulated considerable interest. This was certainly shown by the liveliness of the discussion periods. In all, some 690 delegates registered, of which 57 were day registrations.

We were fortunate this year to have Mr Eldon Griffiths of the new Department of the Environment to open the Conference. He gave a stirring address and made it quite clear that he was under no illusions about the reasons for the current shortage of solid smokeless fuel. His address is published in full later in this journal.



The Mayor welcomes delegates

The Mayor of Southport, Alderman Mrs. Jean Leech, J.P., gave excellent support and was frequently with us on business and social occasions. Indeed the Borough of Southport were always extremely helpful and contributed in no small measure to the success of the Conference.





Mr R. E. Boote speaks to the Open Session

On the Wednesday afternoon, which this year was not given up to technical visits, Mr. R. E. Boote, Chairman of the European Committee for the Conservation of Nature and National Resources, Mr. Stanley Jeeves, Secretary of the Lancashire Branch of the Council for the Protection of Rural England and Dr. A. I. Ross, the Medical Officer of Health for Bolton, addressed an Open Session of some 1,100 delegates and visitors. The session was ably chaired by Alderman Hourigan, Chairman of the Manchester Regional Hospital Committee and was a great success in every way. This was very fully illustrated by the interest shown in the questions that were asked at the end of the session. We are very grateful to the ladies Working Party organised by Mrs. M. E. Willison, who put in so much hard work and also to the Merseyside and North Wales Electricity Board for being so generous as to provide tea for our visitors.





Some of the audience at the Open Session



Mr C. Darley addresses conference



The Council passed one resolution which read as follows:

"That, in view of the difficulties associated with present fuel availability and distribution, this Society makes immediate representations to Her Majesty's Government stressing the urgent need for a national fuel policy for this country; and that such a fuel policy, embracing all types of fuels, be formulated and implemented without delay; and that it be reviewed and amended from time to time as circumstances demand".

Socially, the Conference was a great success. Many member organisations went out of their way to provide lavish hospitality and most delegates were very fully engaged in their spare time. The Civic Reception given by the Mayor and Corporation of Southport was extremely well attended and obviously much enjoyed by all. This year there was a very much better attendance at the Conference Dinner and Dance which was a most enjoyable and happy occasion.



The Conference in Session

## Publicity

The 1970 Conference and Exhibition enjoyed very good publicity from all media, nationally and locally.

Two television programmes featuring the "breathalysing" of motor cars in Lord Street, Southport, together with interviews with the Director were shown, one on Tuesday, 20 October in the BBC programme "Look North", and one on Wednesday, 21 October, in the Granada programme "6.01".

Six interviews for various BBC radio programmes broadcast in the North and Midlands were given during the Conference.

The National and Provincial press devoted 2,238 column inches to reports on the Conference and Exhibition. This represented publicity to the value of £5,903 if the Society had had to buy the space.

The Trade and Technical press coverage to date (3 November) totals 187 column inches. This figure cannot be regarded as final because many of the trade and technical publications which give detailed coverage of conference papers have not published issues since the Conference.

On the opening day of the Conference members of the Conference Committee acted as hosts at a buffet lunch given for members of the press at the Royal Hotel.

## Technical Visits

### **The Borough of Middleton, Refuse Incinerator Plant**

Within a few hours of the official opening of the Conference, two coaches carried enthusiastic delegates through the developing New Town of Skelmersdale via the M.6 motorway to Manchester and thence to Middleton, which is situated on its Northern border. It was noticed *en route* and with satisfaction that the new housing in Skelmersdale was either all gas or all electric, consequently, it seems, there will be no domestic smoke problem.

The party was a little surprised to find the incinerator practically within the Town Centre Redevelopment Area. Though they were shortly to learn from Mr. A. T. Traynor, the Chief Public Health Inspector, that this had been constantly in mind when the plant was being designed.

The party was quickly divided and allotted guides who were clearly well practised as the plant had already been visited by some thousands of officers and representatives of local authorities both from home and overseas.

The plant was built by Messrs. Motherwell Bridge (Tacol) Ltd., in 1966 for about £364,000 and the company was represented on this occasion by their design engineer, Mr. C. R. Mowle.

The Council have justifiable pride in that their plant was the first of its kind in Britain. Every authority and officer likes to have just one "first" and how often it is that these honours go to the smaller authorities.

The plant differs from most others in that a grab is used to transfer tipped rubbish to a feed hopper which is sized to avoid spillage. The amount of refuse being fed to the furnace is regulated by a water cooled ram. There is of course ample dust extraction equipment both over the main reception bunker and at the point of discharge of refuse to the furnace. Dust loaded air is fed as combustion air to the furnace. A mechanical grit collector has been provided and separated dust is fed into the submerged ash conveyor at the foot of the incinerator. This is operating at about 0.12-0.15 gr/cu. ft.



It seemed from general observation that the plant was operating below capacity and that if the input of refuse could be increased it might lower the cost per ton incinerated and improve overall efficiency. It was noted that at least one neighbouring authority was delivering refuse and this may be a good omen for the future.

The ancillary buildings were spacious and nothing had been omitted. Although full use was not being made of all the welfare facilities, particularly washing, drying and changing rooms, there is no doubt that a generation will arise which will look for and welcome these amenities. The collection and disposal of refuse will not for ever deserve the connotation "dirty job".

The well-being of the visitors was not overlooked either and they thoroughly enjoyed the generous hospitality provided to sustain them over the return journey to Southport. Mr. S. Clayton expressed to the Council the appreciation of the Society and the party for the opportunity of seeing the plant and learning something of the problems which follow for an authority which ventures into refuse burning and also their thanks for the time and trouble taken by Mr. Traynor personally and his staff in explaining what was best in the plant and equally, where there were deficiencies and the suggested remedies. The future of the River Irk was not discussed!

There is no doubt that this visit complemented the paper and discussion on Disposal of Wastes by Incineration which took place in the third Session of Conference on the following morning.

*S. Clayton*

### **Electricity Council Research Centre, Capenhurst**

The party of delegates who visited the Research Centre at Capenhurst on Tuesday, 20 October, enjoyed a journey through Liverpool, including the Tunnel, and into the Wirral with fine dry weather to help. The return through Liverpool's rush-hour was also quite an experience.

At Capenhurst the party were welcomed by Dr. Churchman, Director of Research, and received a brochure explaining the main functions of the Research team. The delegates were then split into three parties, which were conducted round the Centre by guides. Five separate projects were visited, inspected and explained in detail:—

Space heating by means of advanced storage radiators using micronised barytes and a "thermal storage wall".

Space and water heating by means of heat transfer by steam from block storage to water in a self-contained boiler unit.

The environmental chamber used to establish what is "a state of comfort" and how to combat the various distractions of discomfort.

The treatment of various effluents by electrolysis, ozone and electrolytic flotation.

Research into Zinc-Air and Sodium-Sulphur battery development to give an adequate range to battery electric passenger cars.

The various Research Officers returned to have tea with the delegates and continue the discussions before the party left for Southport, arriving back via the coast road at about 6.30 p.m.

*L. L. Hughes*

## **Fashion Show for Ladies**

The recipe for a mini figure is the first stage of wearing a midi outfit. And this is exactly what Sarah Linnaker gave guests at the beauty and fashion show held for 120 wives of delegates of the Clean Air Conference at the Royal Hotel on Wednesday, 21 October.

Outfits from Bells, a new boutique in Liverpool, which were modelled during the show.

The dresses were mainly the new length, just below the knee, and although a vote before the show proved that about 90 per cent of the audience preferred the mini, one could almost see them coming round. In fact by the end of the collection the midi had won the day.

Trouser suits were another favourite, and not just for those petite size tens either. Well fitting trousers with tunic tops were modelled in larger sizes and looked most attractive.

And finally, a few tips from Sarah Linnaker for the smaller person who wants to wear a midi suit. "The skirt should be just below the knee and the jacket should be short. Accessories on the jacket should be kept to a minimum so as not to make the outfit top heavy".

## **The North-West Clean Air Competition**

Prizes in the Clean Air Competition were presented at the Opening Session by the president of the Society, Sir Kenneth Hutchison. The first prize of a Snowsports Holiday for three people, plus a solid fuel appliance was won by Judith Seymour of Ostrich Lane, Prestwich.

Judith also won a prize of £50 for her school, the Strand Grammar in Whitfield.

In second place was another girl, this time from Netherton, Bootle. The girl, Miss P. Wynne, of Canterbury Way, won £50 in cash plus a gas or electric appliance to the value of £30.

She was also presented with the Southport Visiter prize of £25 which will go to her school, the Countess of Derby School, Browns Lane, Bootle 10.

The third prize of £25 plus a £20 gas or electric appliance and a £25 cash prize for her school was won by Geraldine Maher. Geraldine attends St. Pious X Girls' School in Manchester and lives at Plymouth Avenue, Manchester 13.

Ten consolation prizes of Raleigh bicycles were won in the competition which attracted many hundreds of entries.

These prize winners were: Miss A. M. Bradshaw, Norris Road, Sale, Cheshire; Nigel Turner, White Street, Warrington; Brian Hill, Windermere Avenue, Orford, Warrington; Laura Foulkes, Acton Avenue, Appleton, Lancashire; Julie Garde, Heather Road, Heswall; Jeanette Pimblett, New Market Place, St. Helens; Eleanor Ward, Beverley Road, Great Sankey, Warrington; Carol McIlverney, Westbank Road, Willington, Manchester; Karen Clements, Marsh Road, Rhyl, North Wales.



## The Golf Tournament

Gale force winds, hail and rain swept across Hillside Golf Course as thirty intrepid members of the Society set off to compete for the Annual Solid Smokeless Fuels Federation Golf Tournament on the afternoon of Monday, October 19, 1970.

The report from the meteorological office said sunshine and showers. The photographs of the players in the 'Southport Visitor' showed that all of them had wisely dressed for showers and had ignored the sunshine.

The competition was won by Mr. H. F. Robinson, Chief Public Health Inspector of Salford who returned a magnificent Stableford score of 41 points, eleven points better than the second, Councillor J. W. Haythorn of Swinton, Yorkshire, who had 30 points and Mr. R. V. Watkin, Public Health Inspector from Haydock Urban District Council in Lancashire with 29 points. The cup and tankard were presented to Mr. Robinson by Her Worship the Mayor of Southport, Alderman Mrs. Jean Leech, J.P., at the Conference Dinner on the Thursday evening, while the prizes of the second and third were presented by the only lady player, Councillor Mrs. G. R. Rowcroft of Bredbury and Romily Urban District Council in the Club House after the players returned.

Even though the conditions were so bad, it was worth reporting that nearly every player completed the Course and returned his card; I think they are all to be congratulated.

*H. Giblin*



The Mayor presents the SSFF Golf Trophy to Mr. H. F. Robinson



## The Tennis Tournament

Strong winds and injury prevented many interested players from participating in this first Conference Tennis Tournament, but in the games that were played, Mr. Derek George, Deputy Chief Public Health Inspector of Hinckley Urban District Council was an easy winner. The Victoria Park Courts were found to be not the most sheltered and the gusty winds made play very difficult. None the less, sufficient interest has been shown and I hope that it will be possible to organise a similar event next year.

I also propose to make enquiries as to the possibility of playing squash and anyone interested in this game should bear this in mind for next year's Conference.

*G. W. Aston.*

## The Exhibition

The 13th Clean Air Exhibition was held in a specially erected building alongside the Floral Hall.

Larger than last year, it proved to be interesting and presented visitors with a variety of exhibits showing some of the equipment and fuels used to fight air pollution.



Mr Eldon Griffiths M.P., opens the Exhibition



The exhibition was opened officially by Mr Eldon Griffiths, M.P., Joint Parliamentary Secretary to the Ministry of Housing and Local Government. After a short opening speech, Mr. Griffiths, accompanied by the President of the Society, Sir Kenneth Hutchison, C.B.E., F.R.S., toured the exhibition where he took the opportunity to speak to many of the exhibitors.

A feature this year was the "breathalysing" of motor cars. This took place in the exhibition using a Volvo car fitted with their anti-pollution system of carburation, and on Lord Street, Southport, where members of the public were invited to co-operate with their own cars. The Sieger "Cosign" was used in these tests to measure the percentage of carbon monoxide contained in the exhaust gases.

The Society's information stand attracted many visitors who expressed interest in the work of the Society.



The Solid Smokeless Fuels Federation Stand



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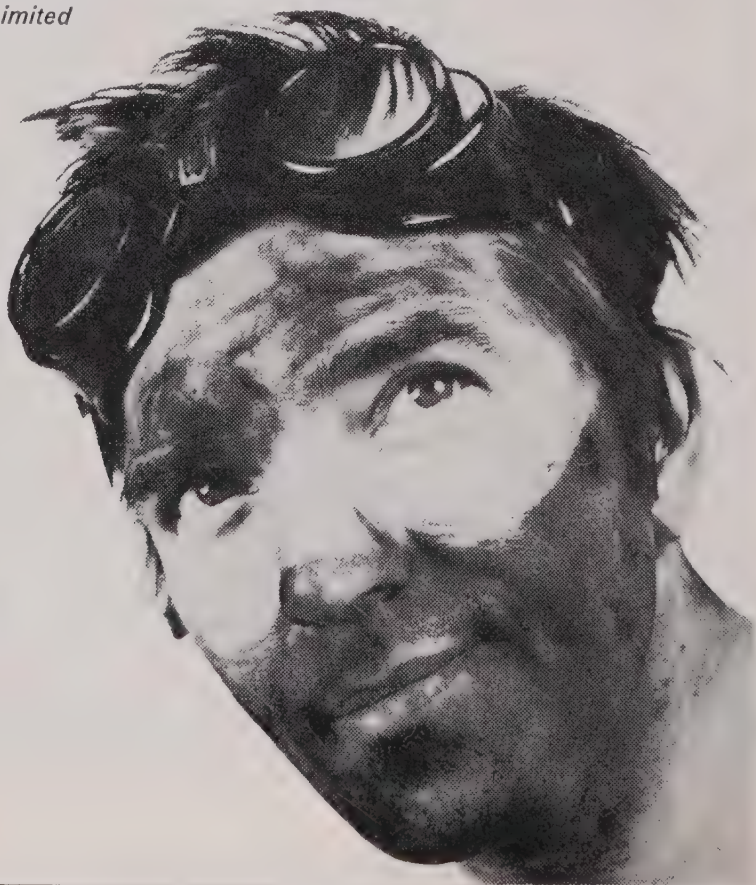
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# SOUTHPORT CONFERENCE

## Opening Address

**By Eldon Griffiths, M.P.**

*Joint Parliamentary Secretary, The Ministry of Housing and Local Government*

I want to start with a quote from Dickens.

“Fog everywhere.

Fog up the river, where it flows among green meadows; fog down the river, where it rolls defiled among the tiers of shipping, and the waterside pollutions of a great (and dirty) city.

Fog on the marshes, fog on the heights.

Fog in the eyes and throats of ancient pensioners, wheezing by the firesides of their wards; fog in the stem and bowl of the afternoon pipe of the wrathful skipper . . . fog cruelly pinching the toes and fingers of his shivering little 'prentice boy . . . Chance people on the bridges peeping over the parapets into a nether sky of fog, with fog all round them, as if they were up in a balloon, and hanging in the misty clouds.”

These eloquent and frightening words were written by Charles Dickens in 1855, and the description refers to a much smaller London than the one we know today; but it was a London already plagued by the dense “cold-layer-trap” fogs that still lie so vividly within the memory of a great many of us here today.

These Dickensian, so destructive to human health, fogs were due far less to industry than to smoke, grit and dust from the combustion of bituminous coal, emitted from domestic chimneys.

It is little less astonishing to realise that a full hundred years were to elapse between the mid eighteen-fifties and the coming into force of the first general statute aimed specifically at domestic smoke. During that 100 years our great cities went on growing and, accordingly, the domestic chimney, numbered by the tens of millions and emitting its poison at low levels became more and more the principal source of air pollution and urban fog; yet for 100 years, we did nothing, or almost nothing.

This fact has always struck me as an example of the great British tendency not to take action until many years after it has become perfectly obvious that action needs to be taken. In fact, it is an extreme example. Wilberforce in his own lifetime saw the slave trade abolished. Shaftesbury lived to see the early Factory Acts come to fruition. Hospitals had long become completely different places by the time Florence Nightingale died.

Yet the pioneers of Clean Air, the founders of your Society, did not live to see the inception of the Clean Air Act of 1956. Much less did they see its real harvest, for which we have had to wait roughly another ten years.

The Coal Smoke Abatement Society was formed, as you know, in 1899. It had a hard struggle for many years and its members often had to make a nuisance of themselves—a thing that English people, fortunately, have always been fairly handy at doing in a good cause.

The Public Health Acts of those days very properly contained provisions against industrial smoke, but these provisions were very seldom invoked. Solid Victorian prosperity was founded on the belief that smoke—like muck—meant money.

The main object of the Society in its early period was to obtain reliable evidence about industrial smoke emissions and try to get the Vestries—the forerunners of the Borough Councils—to prosecute. But not a great deal could be done in those days about domestic smoke, because, quite simply there was no alternative to bituminous coal.

So the real hard core of the problem perforce had to go untackled. The turning point, I believe, was the great London smog of 1952. No one who experienced it is likely ever to forget it. It lasted four days; and quite apart from the 4,000 deaths it caused—I believe the estimate is around that figure—it cost an incalculable sum in lost working hours, broken appointments and undelivered consignments, not to speak of the spoiling of domestic fittings—carpets, curtains and wall-paper. But it also marked, I think, the end of the century that might be said to have begun with that rather striking description of a London fog with which I began my speech.

The pioneers of the National Society for Clean Air had now carried their main point: or Providence had carried it for them.

From now on, it was not just a question of whether anything should be done about domestic smoke, as distinct from industrial smoke; it was a question of what should be done, and Sir Hugh Beaver's Committee was set up to find the answer.

I recall all this for one particular reason—to emphasise that you—the members of this National Society—are entitled as it were to look back at least for a moment, down the slope of a long, long hill, up which—or up a very substantial part of which—you have helped to pull this country.

And what a pull it has been!

I will not say you have had to pull us by the scruff of the neck, but perhaps at times you have had to deal with, shall I say, a certain lack of imagination, and, on occasion, a mood of recalcitrance!

But I hope that nevertheless, you will look back with satisfaction and a proper sense of pride.

This morning, and on behalf of a new Government, I am glad to convey our thanks and congratulations on the fine work you have accomplished.





May I also record how substantial our achievement, as a nation, has been?

The usual tendency is to concentrate on the work of the London Boroughs, and in the sphere of domestic smoke control their accomplishments are, indeed, quite remarkable.

But finding myself rather further north today, I think I should say a little about the scarcely less spectacular achievements of some of the great provincial cities—take Birmingham as an example.

Birmingham has the largest acreage of any county borough in the country—over 51,000 acres, but it has now got 59 per cent of this vast area covered by smoke control orders.

For each of the past four years, one large order has been made every year, covering 22,000 premises.

By the end of 1972, when the fourth of these orders is due to come into operation, 63 per cent of Birmingham will be under smoke control, and six or seven years after that, when the smoke control programme is complete—that is, by 1979—the concentration of smoke in the Birmingham atmosphere will be only 10 per cent of what it was in 1956.

All this, I believe, is progress, and it is interesting to note that the pattern of domestic fuel usage in Birmingham has changed very markedly since smoke control began.



In 1960, three out of four of the fire places converted to smokeless fuels were adapted to burn solid fuel, and only 20 per cent to gas.

This year, the proportion of conversions to solid smokeless fuel is only 28 per cent, while conversions to gas are up to 67 per cent.

This tendency, of course, is general and the shortage of solid fuel is likely to accelerate it; Birmingham's figures illustrate the rate at which this change is taking place.

## 2. My second example:—

SHEFFIELD, which until the ninteten-sixties, had a pretty poor reputation for smoke, going back 150 years. But with the passing of the Clean Air Act 1956, the City Council prepared an ambitious five-year plan, the first order of which became effective in 1959 and covered 500 acres in the central area. At the same time, the council organised a clean air exhibition and a civic education and propaganda programme—and I can testify to the great vigour and civic pride with which those have been pursued.

The entire city area of Sheffield now seems likely to be covered by smoke control by the end of 1972.

It is only fair to add that in Sheffield, perhaps almost more than in any other major city, the old idea that "where's smoke there's money" has tended to die hard. Supporters of clean air have had their difficulties in winning converts at the heart of a coal-producing area. Yet, the extent of the difficulties is matched only by the achievement.

For example, in 1956, eight gauges in Sheffield measured a total concentration of 2,610 microgrammes of smoke per cubic metre.

Fourteen years later this had diminished to a total concentration of only 788 microgrammes—an average of less than a quarter of what it was when the programme began.

Sheffield, too, is a very large area—45,000 acres; a great deal bigger than Liverpool. Yet the proportion of the city covered by smoke control, 64 per cent, is little less than Liverpool's.

LIVERPOOL'S achievements for all that are no less remarkable. In Liverpool, the campaign against smoke was divided at the outset into three spheres—industry, the port, and of course, the domestic chimney.

The smoke control programme was therefore co-ordinated with a supplementary drive to abate smoke from liners and tug boats, and to cut back emissions of smoke and grit from industrial premises.

The first smoke control areas covering the centre of Liverpool met with so much approval from people working there, that smoke control was soon extended to the rest of the city. This in turn was co-ordinated with the slum clearance programme, in order to obtain the best economic return.



Today, as a result, 69 per cent of the total area of Liverpool is covered by smoke control. A large majority of the Corporation's own council houses are situated in control areas, and the whole campaign will soon be largely a matter of assisting landlords and occupiers to install smokeless appliances in older private housing.

During the next four years, I am advised that 17,000 more houses will be converted, and 21,000—which are unfit—will be demolished.

This leaves about 67,000 dwellings still to be included in smoke control; fortunately, many of these, though not within smoke control areas, already have gone smokeless as a result of "private enterprise" by landlords or occupiers. And as our Improvement Grant policy for twilight houses is accelerated, this trend in the private sector is one I confidently expect to see moving ahead still more rapidly.

I am sure you will agree with me that the achievements in these four great cities reflect great credit on the councillors and the officers concerned. Nor have I said nothing of other cities—Manchester, more than half covered by operative orders; Leeds, with a most creditable record; Bradford, which statistically, leads the field with 70 per cent of its total area covered by smoke control.

T. S. Eliot, you may remember, spoke in one of his poems, of someone on whom assurance sat "like a silk hat on a Bradford millionaire."

Well, the silk hats of Bradford are a great deal cleaner today—and the assurance, I do not doubt, is justifiably greater.

Ah yes—you will be saying—but what about the shortage of solid smokeless fuel? Doesn't this represent a most unfortunate set-back to our effort?

Well, like a lot of other things which the present Government inherited, it is certainly a confounded nuisance—disheartening to all those who have laboured so long and hard in the vineyards of Clean Air; harsh on low income families, for they will sometimes find it expensive to convert to electricity and gas; irritating to local authorities who are forced by the shortage to spend their ratepayers' money on converting schools and offices away from cheaper solid smokeless to dearer smokeless fuels. It is also extremely disappointing to a Government that seeks to emphasize the importance of clean air as a vital part of our programme for the improvement of the environment.

The main reason for the shortage as you know is the replacement by North Sea Gas of the old gas-coke, formerly produced in large quantities by the NCB. During the current year (1970-71) the amount of gas coke available will fall by 1,700,000 tons; next year the supply will drop to a negligible figure; by 1973 there will be none.

Our predecessors in Government apparently expected the NCB to fill this gap by stepping up production of other smokeless fuels. After all, in a speech to the Coal Utilisation Council in February 1965, Lord Robens had told them that the Coal Board were planning 10 Roomheater plants producing an annual total of 1 million tons, and that each plant could be up and running within 11 months!

All this incidentally in addition to 650,000 tons of the Coal Board's smokeless Homefire fuel, given these assurances—and widespread advertising of the attractions and cheapness of these new solid smokeless fuels—large numbers of people moving into new houses installed stoves to burn solid smokeless fuel.

Hundreds of thousands living in older houses converted—with Government help—to these new types of fuel. The vast majority of these people, I am glad to say, still can obtain smokeless fuel. But others, I am sorry to say, have been—and are being—let down.

Let me quote to you from a speech given by Lord Robens to your Society two years ago. He said then:

“A recent study of the supply and demand situation has satisfied us that capacity already installed will be more than adequate to meet immediate demand and to make good the rundown in gas coke availability. But the steady increase in the number of smokeless zones planned over the next few years will result in a greater demand for smokeless fuels which we are satisfied can be met by the combined resources of the Board and the independent producers. It is not our intention to let slip any opportunity to increase our business through lack of supplies, and local authorities can progress their smoke-control programmes in the certain knowledge that the necessary domestic solid fuels will be readily available.”

In spite of all these assurances given by Lord Robens himself that the demand for solid smokeless fuel “could be met”; that their new production capacity was “more than adequate” to make good the rundown in gas coke; that local authorities could go ahead with their smoke control programme “in the certain knowledge” that the necessary supplies would be available, the hard reality is that neither Homefire nor Roomheat will be in full production until 1973 or 74—six or seven years late.

Maximum production of Roomheat (promised in 1965 to be 1.2 million tons) will now be only 25,000 tons in 1969-70 and only 240,000 tons in 1973/74.

The consequences of this shortfall can be seen already in the suspension last winter of smoke control orders in 16 local authority areas. This winter so far, a further 127 orders covering 151,250 premises have had to be made. I fear there will have to be more.

But we must keep our annoyance within the bounds of proportion.

The extra amount of bituminous coal which will be burned this winter—



and I am afraid, next winter too—will only be marginally noticeable in its effects. It will represent a mere fraction of what used to be burned in the days before smoke control. The shortages will be local. The areas most affected will be the North West and London; but the extra amount of coal burned in London, for example, will be at worst only about one twenty-fifth of the total amount which London was burning in 1952. As far as I am advised there is little danger of another great smog.

Help, too, is on the way. Here are some of the steps the Government has taken to help:

- (1) We have arranged for the gas industry to produce from uneconomic plants, including three old fashioned gas works in the North West which would otherwise have closed down, 170,000 tons more coke than they would have done. The cost to public funds is estimated to be £300,000.
- (2) The NCB has scoured the industrial world, looking for solid smokeless fuel which we can import. The result is 75,000 tons of briquettes, which are now being imported from France.
- (3) We have asked local authorities to reduce their use of solid smokeless by converting to other fuels. Local authorities have responded well, and we owe them a vote of thanks for saving a further 300,000 tons of coke this year.
- (4) Meanwhile, the Government itself has reduced consumption of solid smokeless fuel in its own establishments by 150,000 tons. (This includes 68,000 tons for hospitals).

I am sure you will agree that these four steps show the present Government's commitment to the Clean Air Policy. But there are other things we have done, too.

Private producers of solid smokeless fuel have been encouraged to increase their output.

Rexco are building a new works which should produce over  $\frac{1}{4}$  million tons of solid smokeless fuel when it is fully in operation. Coalite—to whom the Ministry recently gave planning permission for a large new plant at Rossington and who are also extending their existing works at Grimethorpe—now expect their domestic output to approach an annual rate of 2 million tons by the summer of 1972, an increase of nearly 50 per cent compared with the present position.

Assuming these plans are met, I have every hope—I suppose in view of what has happened in the past it would be unsafe to say more than that—that we shall overcome the present shortage by the middle or end of 1972. Supplies by that time once more should be equal to demand, and we shall press on, vigorously with the programme.

And so I return to your Society, and its future during the seventies, when we can expect smoke control to move steadily on towards completion over the length and breadth of the country.

Some of you I know, are asking—"what should be our role?" Well, there still is much to be done—especially, if I may say so, in the Society's traditional field—in the gentle arts of persuasions!

For example, there are still more than 20 local authorities in the "black" areas who still have made no smoke control orders. A great many more have done very little, just a few orders on undeveloped land in peripheral areas—no more than the minimum needed to keep themselves off the list of culprits.

This is not good enough. So plainly your educational and evangelical role must not be allowed to diminish. In fact, I hope to see you intensify your efforts to convert the hard core of local authorities who either do not believe in smoke control, or who consider it is not worth the money (and this in spite of the fact that they have to pay only 30 per cent of the costs of conversion), or who in some cases, are waiting for slum clearance to finish the job for them.

There is, too, another field in which your efforts are needed—a new field altogether. It is the need for people to know what they are talking about in the field of clean air, and to be helped not to talk what too often is emotional nonsense.

With the wide and rapid growth of interest in air pollution, there has arrived a great deal of sensationalism, some of it very unsound. Not long ago, for example, one of the London evening papers ran for a few days a "scare" feature on sulphur dioxide and its insidious, invisible dangers. I honour this paper's motives, but what they failed to report was what this Society could have told them—that far from rising low-level urban concentrations of sulphur dioxide fell by 40 per cent, during the nineteen-sixties.

Too many people these days simply do not realise what rubbish they are talking on the subject of clean air. This is a field in which England leads the world and we can be justifiably proud of our achievements: but for some reason or other, that is the sort of thing which never is said very loudly.

The word "pollution" quite rightly evokes a strong emotional response. But in this connection, may I remind you of what the Chief Alkali Inspector said in his recently published report?

"We must beware the obvious danger that emotions could be roused to the point of over-riding common sense. Prophets of doom who predict the more bizarre kinds of human catastrophe and paint rather self-righteous pictures of scientists as irresponsible villains exploiting humanity to the point of disaster, could well be doing their (and our) cause great disservice. Not only is there a genuine danger that time is wasted in answering the resultant flood of questions from an alarmed public, but creative effort could be diverted from the more profitable pursuit of official duties. Above all, I fear we may lose sight of the real dangers and dissipate our resources."



Incidentally the Chief Inspector is shortly to receive the George Davis Medal of the Institution of Chemical Engineers, and I congratulate him on this rare distinction for a member of the Civil Service. Incidentally, somewhat later in his report, the Chief Inspector added "Pressures from conservationists, antipollutionists and the public have nevertheless helped us to raise standards, gain better enforcement and introduce beneficial legislation. The National Society for Clean Air has been outstanding in this field of activity."

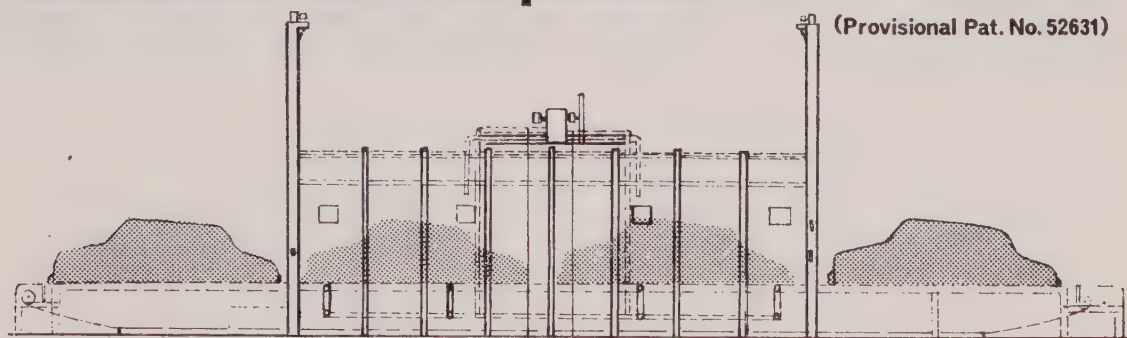
I share the Chief Alkali Inspector's confidence in the influence and effect of this Society, not only in the sphere of domestic smoke control, but also in the field of industrial pollution, where there still is much to be achieved by helping. Moreover, in pursuing your role as educator of the public, and as critic and spur to Government (where necessary), an independent Society like yours is of the greatest social and political value. Britain has always specialised in producing societies and other organisations of people who are not going to be messed about or put off with a lot of drivel and pretentious rubbish. Your Society is one of these organisations, and I wish it a happy and successful conference.

I hope that a well-deserved sense of solid achievement will fill the stout hearts of all your members and I have every confidence in its prospects for the ensuing decade.

And who knows? Perhaps one day, before too much longer, some of us will find ourselves explaining, in reply to questions from the youngest generation, the meaning of that obsolete and Dickensian word "fog."

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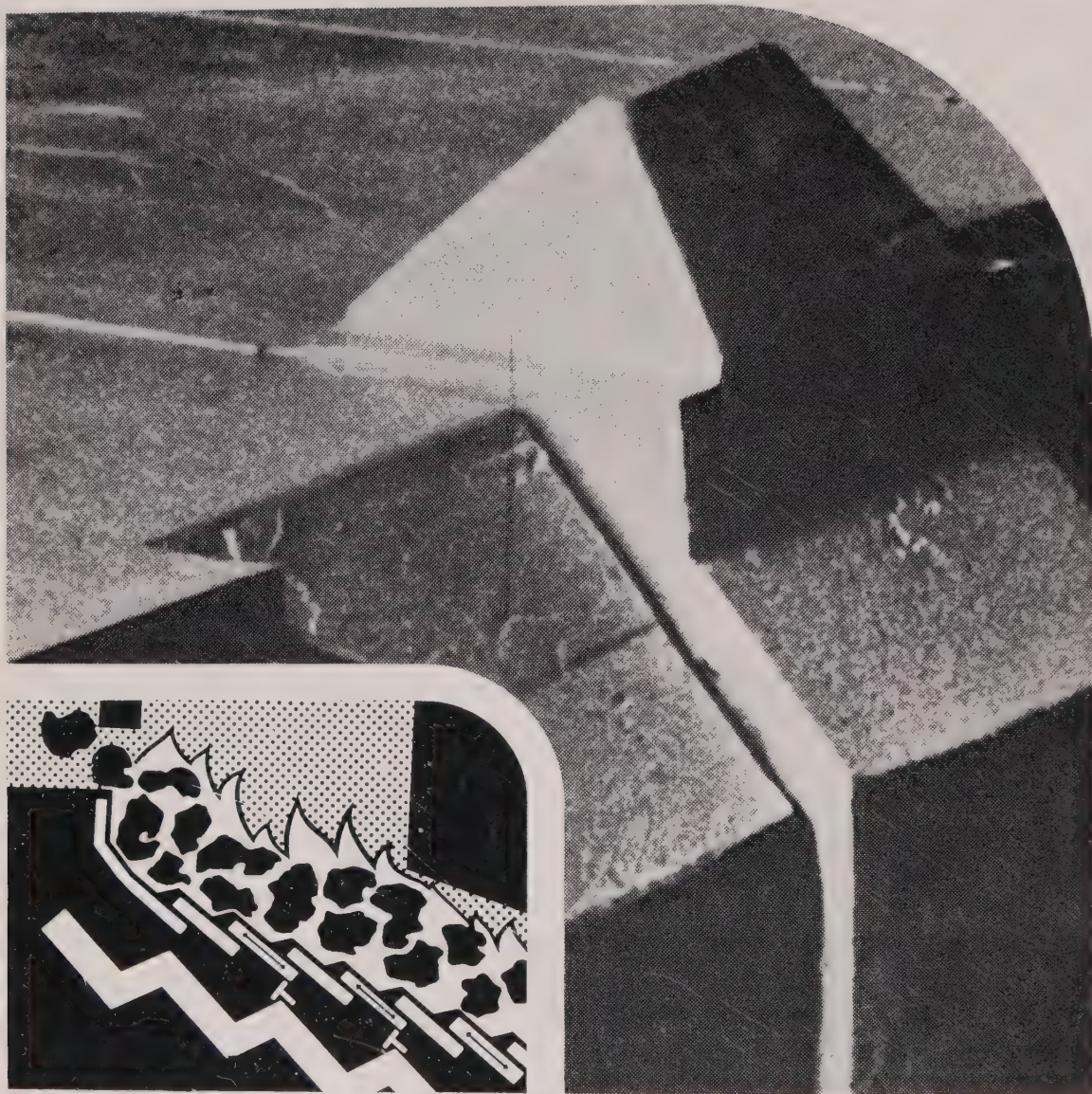
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## Presidential Address

**By Sir Kenneth Hutchison, C.B.E., F.R.S.**

1970 is European Conservation Year and many organisations and individuals and eventually the governing bodies in most European Countries having finally wakened to the fact that if their countries are to survive in anything like conditions fit to live in, then they will all severally and collectively have to do what the National Society for Clean Air has been doing for 70 years: identify their problems, get organised to deal with them and find the resources to do so. It goes almost without saying that support will be forthcoming for any action designed to reduce pollution, but the support tends to become less positive when the cost in money terms and personal inconvenience is all added up. Conservation Year has focused attention on the problems which are capable of solution within our present technology and the inter-action of experience in different countries will strengthen the case for early effective action. What is important is that when the year is over there should remain in existence the organisations necessary to ensure that the agreed standards are met and if possible improved wherever science and technology can show the way.

The interest shown by HRH The Duke of Edinburgh in the work of European Conservation Year and his support of the British Year has been of great value in making the public generally aware of what is involved in pollution and all that is required for the conservation of the environment. The appointment of a Royal Commission, under the Chairmanship of Sir Eric Ashby, will ensure that the various activities are coordinated and, hopefully, money be found for essential research and development. We in the Clean Air movement have our well-defined objectives and although our field of activity may appear small compared with the whole range of environmental problems now being tackled, it remains true that while a man may spend a life-time without seeing a wild bird or wild flower and may detest the seaside and prefer the fish he buys in a shop to any he may catch in a purified river, he must still breathe and the air he breathes is the business of our Society.

Tempting as it is in this second Presidential address to range over the whole environment, I will confine my remarks to what concerns our Society and although there are no proposals before us for amalgamation with others or enlargement of our primary objectives, I shall suggest that there is room for considerable enlargement of our activities within the limits of those objectives.

The International Conference at Washington, in December, will provide a platform for discussions of experience in the many different countries which will participate and will strengthen the case for action in each, although the prime cause for complaint may not be the same everywhere. The smog on the Californian coast is attributed to motor car exhausts which under certain meteorological conditions suffer photochemical changes in the upper atmosphere. The smog in New York with its high-vertical population density results from waste gases from heating and power generation systems which depend almost entirely on the burning of coal and residual oil within and around the conurbation, added to exhausts of motor cars. The atmospheric conditions of the Ruhr are the result of a high concentration of industries and a high population density. We in Britain have achieved an enviable position by demonstrating how the air of a big city can be cleaned up although this does not give grounds for complacency whilst so many of our industrial areas remain as they are. It is estimated that in the last 15 years there has been a 55 per cent reduction in the smoke emitted in the U.K. The north of England can claim only 45 per cent, but the south of England is better at between 50 per cent and 55 per cent and in London the reduction is more like 75 per cent.

There can be few who doubt the benefits of clean air and their number will not include any who knew London as I did nearly fifty years ago, and had experience of the traditional "pea soupers" the only supporters of which seem to have been the French impressionist painters; since Monet and Pissaro, and some others, came regularly each winter to record on





canvas the curious effects of light in the murky atmosphere of London at the turn of the century. It is enough for us to see buildings being renovated and scrubbed clean, and to look again with pleasure at the trees and bushes in the parks and squares. In the City of London pomegranates now grow in Bunhill Fields; and what were formally Victorian type shrubberies of privet and laurel now bloom with azaleas, camellias, rhododendrons and heather. Enough perhaps to record the simple fact that the sun now shines more often and more brightly than any of us can remember before. But having congratulated ourselves on what has been accomplished we remain only too well aware that the atmosphere in a street full of cars, lorries and buses all with their engines idling in a long drawn out traffic jam, can be a very unhappy example of urban environment.

Progress towards clean air encountered quite heavy opposition, understandable where peoples' way of life was being affected by new legislation, but with patience and the skilful use of communication media, the case had been put over successfully and there was general acceptance of its benefits until now, most regrettably, a shortage of supplies of solid smokeless fuel has thrown doubts on the policies of our Society, incorporated in clean air legislation. The shortage arises from the fact that the gas industry has had to abandon carbonisation and so gas coke production will cease in a year or two. Apart from the fact that carbonisation was no longer commercially viable, and would have been replaced in any case by oil gasification, the gas produced is incompatible with natural gas from the North Sea, for which all appliances are being converted. The hoped for alternative of char briquetting seems still to be some way from technical and economic success. No doubt present difficulties will be overcome and additional supplies of low temperature carbonisation products will help to fill the gap.

Meanwhile we might recall a celebrated Queen of France, who on being told that her people had no bread, is said to have replied "Let them eat cake". I hope to be more fortunate than Marie Antoinette, who lost her head eventually, if I now advocate for domestic use what were once known as luxury fuels—gas and electricity—which cost little if any more to run under carefully controlled conditions, and allowing for the higher standard of comfort attained. It has been heartening to see the positive advocacy of clean air by the Gas Council, who however encountered displeasure in certain quarters by daring to state unpalatable facts about coal in a rather pointed manner. I venture to doubt whether the self appointed judges in the advertising association, who ruled that a certain advertisement should be withdrawn, are the people best placed to decide this matter and I hope that the Gas Council will now direct attention also to the social benefits of levying purchase tax on gas fires should be apparent by now and this tax should go, and if in the cause of fairness to all, purchase tax on electric fires and oil heaters must also go, there would not be any great loss of revenue. We may recall that these taxes were introduced some twenty years ago with the mistaken idea that they would have the effect of lowering the peak load of electricity. Given some such encouragement, the rate of voluntary conversion to clean air might well exceed what was

being achieved by the rather slow machinery of the 1956 Act, and progress would be maintained until sufficient solid smokeless fuel is available, to allow the provisions of the Clean Air Act to operate once again. But if a further long delay is foreseen there is a good case for amending legislation and administrative action to allow a second conversion in existing smoke control zones to such fuels as are available, and for new zones to be created, in which those who are willing to convert to the smokeless fuels available can do so.

This country led the world in legislation to produce cleaner air in the form of the first Alkali Act, which was passed in 1863, and still remains in force today with modifications and extensions. The principle which it established of using the best practicable means for preventing the escape of obnoxious or offensive gases to the atmosphere and for rendering such gases harmless and inoffensive still applies and has been, to a large extent, the basis for much legislation regarding clean air. In 1875 the great Public Health Act was passed and six sections of it applied to smoke. Smoke was dealt with as a nuisance and it was necessary for nuisance to be proved before action could be taken against any offender. This legislation still applies and has been amended and extended by the Acts of 1891, 1926 and 1936.

Even before the Clean Air Act of 1956 became operative, certain cities in this country had established smokeless zones, and the whole idea of the smokeless zone—what is now called the Smoke Control Area—was that of a former Chairman of this Society.

In between the two great wars, industry started to put its house in order. It discovered that to make smoke was to burn fuel uneconomically; and it may well have been for economic reasons that this change originally came about. Nevertheless, the Society led the way in establishing classes for stokers and boiler house attendants. In the old days an unskilled man would often be put in charge of the boilers. He knew little or nothing about the principles of combustion involved in burning fuel properly with the maximum reduction of smoke. But with the institution of these classes, it was possible for employers to send their boiler house attendants to be given some basic training, and the results have proved well worthwhile—not only to the general public who get cleaner air, but also to the industrialists themselves who get a better return from their fuel. The work the Society started was taken over and greatly extended by the Fuel Efficiency Branch of the Ministry of Fuel and Power and later by the National Industrial Fuel Efficiency Service (NIFES).

Then in 1956, following the report of the Beaver Committee, appointed after the great smog of 1952, came the passing of the first Clean Air Act. Not just the first Clean Air Act in this country—but the first Clean Air Act in the World. This has been amended and strengthened by the recent Act of 1968.



A few figures will show what has been accomplished. In 1931 it is estimated that 2·71 million tons of smoke were emitted from the use of coal alone. In 1967 the figure was ·87 million tons. Similarly, there has been a noticeable reduction in sulphur dioxide in the atmosphere at breathing level, though the total emitted has only just started to fall. In the north there has been a reduction of about 45 per cent while that in London is of 20 per cent only. This reduction has been achieved by taking full advantage of natural dispersion processes and the use of high stacks. Nevertheless dispersion is not a cure; it is a palliative only.

Turning now to those things that remain to be done and about which we must take action. Between 60 per cent and 70 per cent of all the smoke in our atmosphere is still produced from domestic sources, in spite of the Clean Air Act and in spite of the fact that some 350 local authorities have introduced smoke control areas. The problem of grit and dust is a growing one. Sulphur dioxide is still a problem even though we do breathe slightly less of it in our ambient atmosphere. Odours are another problem, and become more obvious as the air becomes cleaner.

Industry has some special problems. In some instances, the technical knowledge is available but the cost of fitting the necessary equipment in the form of arresters and cleaners can become uneconomic or even prohibitive. In iron and steel works, for example, much more could be done. A lot has been done already, and Sheffield is now one of the cleanest cities in the world. Equipment does exist but it is expensive and if such equipment were to be fitted to all iron and steel works this could well put up the price of steel.

Cement works present another problem. In the newer works a great deal of money has been spent in fitting sophisticated electrostatic precipitators. When these are working properly some 99·8 per cent of the grit and dust is arrested, but unfortunately blobbing occurs and the arresters do not always work properly with unpleasant results for those who live in the vicinity of the works. Brickworks still present a problem and so do some oil refineries. Many of these problems are technical and economic. They require more research and the expenditure of a great deal of money.

One of the biggest problems in this country is that of pollution generated by petrol engined vehicles. Certain statutory regulations have been issued under the Road Traffic Act regarding emission of smoke from diesel engined vehicles. Unless legislative action is taken about the motor car very soon, much of the good that has already been achieved and is being achieved will be undone. Here we have a situation where the British motor industry has the technical know-how and capability of building cars for the American market where the regulations regarding pollution from exhausts are extremely stringent, and yet we cannot introduce legislation regarding cars in this country because, we are informed, there is as yet no direct medical evidence that the pollutants emitted are dangerous to health. Although there may as yet be no medical evidence to show that exhaust fumes are harmful in the concentrations in which they are met in the street, it is clear to any thinking person that on the grounds of amenity alone, action should be

taken, and since the number of motor vehicles is expected to increase from 15 million now to 23 million in 1980 the longer we delay the more difficult the problem will be.

If legislation were introduced in this country now, it would probably be 1973 before the first car, suitably fitted, came off the production line. If one gives the average car a life of between 7 and 10 years, then it will be 1980 to 1983 before any real effect will be felt. It does not seem that we can afford to wait any longer before we take action.

Another problem of increasing magnitude is the modern aircraft, as anyone can see who lives within twenty miles of an airport.. Modern jet engines, under certain conditions, do emit unburnt kerosene and smoke, and this does pollute the atmosphere. Although this may not constitute as large a problem as that of the motor car, it is one that should be tackled early before it gets out of hand. It is surprising that this most modern form of transport should seem to be emulating the early steam locomotives.

From this very brief review, it can be seen there is a great deal remaining still to be done in the field of clean air and its contribution to the environment, and we in the National Society for Clean Air must move with the times. We must avoid the danger of becoming too involved with the problem of domestic smoke. True, it still exists and is still responsible for more than half the smoke in our atmosphere. But we know what the answer is, and if, the local authorities will push ahead with the establishment of smoke control areas the problem of smoke will largely be cured.

During the next few years our attention will inevitably become directed more towards the problems of industry. Those who have read the report of the Alkali Inspector will appreciate that the examples I have quoted are neither comprehensive nor representative, but will have gained some insight into the complexity of the matters involved. If we are to fulfil our function of promoting the cause of clean air we must now get closer to industry and invite their representatives to discuss their problems and their plans with us. The Society has a good reputation in Government and industrial circles, and must continue to speak with sure technical knowledge. They must be guided by technical advice on the selection of priorities among the many objectives which they may want to pursue, having regard always to what is reasonably practicable and the time scales proper to the solution of any one problem.

I believe that to do this work properly we shall require additional help in the technical field (not all of which can be assumed to be voluntary), and that we should invite industry to take a much more active part in our affairs. Their support will be necessary both financially and through the appearance of representatives at our general and local meetings. The Society for its part, can offer a platform at which problems can be discussed and the views of both sides can, we hope, be reconciled. Such meetings, and the appropriate technical publications, will enable those responsible for enforcing the law, in many cases local authorities, to move with the times, and I am referring here to elected members as well as officers; they should



all make themselves aware of the problems with which they have to deal. The Alkali Act is on the statute book, and will continue to be a final arbiter on industrial emissions. Its philosophy of "the best practicable means" is a continuing process but what was practicable in 1960 is not necessarily the best practicable means in 1970. The Society must be well informed and not make the mistake of pressing for the impossible, but they should also be able to judge what is possible and not hesitate to remind industry of its responsibilities to the community.

The business of our Society is clean air and we have no plans for extending our activities into other environmental problems, but it is not possible to disregard the effect of each part of the environment on the whole. For example, the disposal of waste is becoming more difficult and incineration is now being favoured, which brings waste disposal right into the province of clean air, since many waste products when burnt can pour pollutants into the air. As another example it is no good cleaning fumes and exhaust gases by a washing process if the dirty water is dumped into the nearest stream and allowed to pollute the rivers. We should, therefore, support efforts which are being made through the committee for Environmental Conservation and, of course, the newly appointed Royal Commission, as means of ensuring co-operation between all the interested bodies. While, therefore, much of what we do cannot be undertaken in isolation, let us be sure that we are technically sound in our own area, and then if it becomes desirable to enter some form of confederation or constitute a larger body, we at least shall be sure of the ground on which we stand and will speak with authority for those matters which are our concern.

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## **FUEL OIL FIRING COURSE 1971**

The National Industrial Fuel Efficiency Service's Fuel Oil Firing Course will be held at Artillery House, Tilehurst Road in Reading on the following dates:

19-21 January, 1971  
16-18 February, 1971  
16-18 March 1971  
20-22 April 1971  
11-13 May 1971  
8-10 June, 1971

The fee is £25 exclusive of accommodation and meals. It is expected that many people will wish to avail themselves of these courses and N.I.F.E.S. advise early reservation.

# Estimates of Air Pollution in the United Kingdom

Table 1

**Estimates of Pollution by Smoke and Oxides of Sulphur in Million Metric Tonnes from the Main Uses of Primary Forms of Energy in the United Kingdom in the Year 1969-1970**

*(one metric tonne = 0.9842 long ton)*

**Estimates prepared by Albert Parker, CBE, DSc**

*Figures for quantities of forms of energy were derived from the Digest of Energy Statistics 1969-1970 of the Ministry of Technology*

<i>Form of Energy and Class of Consumer</i>	<i>Quantity of Energy</i>	<i>Quantity of Pollutant</i>
<b>Smoke</b>		
<b>Coal</b>		
Domestic, including miners' coal	22.0	0.70
Railways	0.2	small
Industrial and miscellaneous, including collieries	27.8	0.08
	<hr/> 50.0	<hr/> 0.78
<b>Sulphur oxides</b>		
<b>Coal</b>		
Domestic, including miners' coal	22.0	0.56
Electricity power stations	77.1	2.20
Railways	0.2	small
Collieries	2.0	0.06
Industrial and miscellaneous	25.8	0.74
Coke ovens	25.7	0.08
Gas supply industry	7.0	0.05
Low temperature carbonization plants	2.4	small
Manufactured fuel plants	1.4	small
	<hr/> 163.6	<hr/> 3.69
<b>Coke (excluding consumption in gas works and blast furnaces)</b>		
Domestic, including other manufactured solid smokeless fuels	6.1	0.13
Industrial and miscellaneous	5.6	0.13
	<hr/> 11.7	<hr/> 0.26
<b>Oil</b>		
Domestic	2.7	0.01
Industrial and commercial	48.0	2.20
Gas supply industry	5.6	small
Road transport	18.3	0.06
Railways	1.1	0.01
Marine craft (inland)	1.1	0.03
	<hr/> 76.8	<hr/> 2.31
<b>Overall total</b>		<hr/> 6.26



Hydro-electricity (coal equivalent)	2.0
Nuclear-electricity     "     "	10.7
Natural gas             "     "	8.4

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Total coal equivalent, including oil at  
1 tonne=1.7 tonnes of coal and  
including petroleum gases

322.7

The amount of 48.0 million tonnes of oil used in 1969-1970 for industrial and commercial purposes is equivalent in heating value to about 81 million tonnes of coal, which if used for the same purposes would have produced about 0.23 million tonnes of smoke and 2.3 million tonnes of oxides of sulphur. The total amount of 6.26 million tonnes of oxides of sulphur is 1.94 per cent of the total coal equivalent of 322.7 million tonnes; the total amount of oxides of sulphur in 1968 was 2.00 per cent of the total cost equivalent.

*Table 2*  
**Estimates of Pollutants from Road Vehicles in the United Kingdom in the Year 1969-1970 in Million Tonnes**

Consumption of Motor Spirit   13.45 million tonnes  
Consumption of Derv Fuel       4.87 million tonnes

<i>Pollutant</i>	<i>Petrol Engines</i>	<i>Diesel Engines</i>
Carbon monoxide	6.3	0.10
Hydrocarbons	0.32	0.020
Aldehydes	0.01	0.003
Oxides of nitrogen	0.22	0.06
Oxides of sulphur	0.025	0.04

The estimated quantity of carbon monoxide discharged into the air from the other industrial and domestic uses of all fuels in the year 1969-1970 is about 10 million tonnes including about 4 million tonnes from domestic heating appliances. These discharges are above ground level whereas the discharges from road vehicles are at ground level.

### Grit and Dust

In the absence of numerous measurements of the discharges of grit and dust from each of the various uses of solid fuels it is possible to make only rough estimates of the total quantity discharged into the air of the United Kingdom. My estimate is that in the year 1969-1970 the total amount was in the region of 0.55 million tonnes with somewhat more than one-half from electricity power stations, one-third from the industrial uses of coal and coke and one-sixth from domestic fires. In addition there are discharges of considerable quantities of grit and dust from various industrial processes, including cement works and iron and steel works for example. The total quantity discharged from these various special processes in the year 1969-1970 was probably in the region of 0.5 million tonnes.



1970  
1971  
1972  
1973



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Address

Position



# News from the Divisions

## North East

On 24 September, 1970, a meeting was held by the North East Division of the Society at the Annexe to the N.C.B. offices, Team Valley Trading Estate, Gateshead, Co. Durham. In his address the Chairman, Alderman B. N. Young, O.B.E., referred to the confused situation which has arisen during the previous year or so in respect of the availability of solid smokeless fuel and the continuation of smoke control programmes. The anxiety which he felt over the immediate future in connection with smoke control generally was shared by many local authorities, particularly in the North East where there was a particular problem and he therefore gave a special welcome to the representatives of the N.C.B. and the S.S.F.F. who were there to address the meeting on this contentious subject.

The Chairman then called upon Mr. L. V. Penzer, Deputy Regional Marketing Director, Northern Sales Region, National Coal Board, to address the meeting on the subject of "The Future of Solid Fuel in the North East". Mr. Penzer opened his remarks by emphasising that the National Coal Board have always been and still are staunch supporters of a national clean air policy and that today's existing difficulties in the solid fuel trade could not be attributed to any defection or omission on the part of the solid fuel industries. He expressed in unmistakable terms his views on the cessation of Gluco supplies and voiced his opinion that a nationalised industry should be expected to operate "in the public interest". He stated that there would be a gap between supply and demand during the forthcoming winter, but that it will depend upon the weather. With reasonable luck he hoped that the solid fuel industry would manage without causing undue hardship but that it was at present a knife-edge situation.

He continued by emphasising that it was in the public interest to preserve and maintain a flourishing coal industry, particularly in the domestic market and to this end Mr. Penzer indicated an outline of a forthcoming publicity campaign designed to urge the use of coal in white areas—those areas where there is no immediate urgent need for smoke control and where smoke control will not arrive for some considerable time. He pointed out that by the adoption of this policy smoke control programmes, when they are ultimately initiated, will prove to be much cheaper because the fireplaces used for burning coal during the interim period would be capable of burning the whole range of solid smokeless open fire fuels which are expected to be available in quantity after 1971. He concluded his address by showing slides of publicity items which would feature in the forthcoming press campaign.

During the discussion which followed Messrs. R. Emerson of Hartlepool, Councillor J. R. Sudder, Consett U.D.C., A. Metcalfe of Tynemouth, Alderman J. H. Baglee of Whitley Bay, S. Mecrow, Shell Mex and B.P. Ltd., W. W. Valentine, Whitley Bay, J. Wear, Felling U.D.C., R. V. Robinson, South Shields, H. Giblin of the S.S.F.F., B. M. Moss of Northern Gas Board and Mr. Waite of the Coal Merchants Federation took part. The speaker adequately dealt with questions relating to the long-term prospects of hard coke, the export of Sunbrite to other parts of the country, the possible shortage of fuel oil, the operation of hard coke appliances, the development of smokeless coal burning appliances and the availability of North Sea gas. At the end of the discussion it was proposed by Alderman J. H. Baglee of Whitley Bay and duly seconded that the following resolution be sent to the Director of the Society for consideration by the Executive Council.

“That in view of the difficulties associated with present fuel availability and distribution this Society makes immediate representations to H.M. Government stressing the urgent need for a national fuel policy for this country and that such a fuel policy, embracing all types of fuel, be formulated and implemented without delay and that it be reviewed and amended from time to time as circumstances demand.”

The Chairman then drew the meeting to a close by expressing thanks on behalf of the assembled members, to Mr. Penzer for his eloquent and informative address and to all who had taken part in the discussion. Members were then entertained to tea and biscuits by the kind hospitality of the National Coal Board.

*L. Mair, Hon. Secretary.*

## Yorkshire

On Thursday, 1 October, 1970, at the invitation of the East Midlands Gas Board the Yorkshire Division paid a visit to the gas reforming plant at Ambergate in Derbyshire. The visit to the works was preceded by a short meeting of the Yorkshire Divisional Council. After this meeting members of the Yorkshire Divisional Council and other members of the Society attending were entertained to lunch at the Red Lion Inn, Stonedge, by courtesy of the East Midlands Gas Board. At the conclusion of the lunch a short descriptive talk was given by Mr. Higton, the manager of the Ambergate Works, prior to a conducted tour of the plant.

This plant is situated on an extensive site of some 44 acres which was originally the site of a lime works constructed by George Stephenson and Company in 1837 which remained in operation up to 1965. In 1965 it became evident to the Gas Board that additional production would be required from 1968 onwards to meet the rapidly increasing demand for gas and it was decided that the most suitable place for the establishment of a new gas works would be on the site of these old lime works. The plant itself, we were told, was begun in January, 1967, and the first gas was admitted to the grid in August, 1968.



In addition to the gas reforming plant arrangements for the storage of liquefied gas have been made. The plant for this consists of an above ground tank of double skin design with a capacity of 5,000 tons of liquefied gas which is stored at a temperature of minus 258°F. The boil off of the gas from this storage tank is reliquefied in a refrigeration system using helium as the working fluid.

At the works members were welcomed by officials of the Gas Board and then divided into small parties, each with a guide, for a tour of this extensive plant. Gas here is produced from a light petroleum distillate in four identical plants using the ICI lean gas steam reforming process. This process and the plant is designed to use either light petroleum distillate or natural gas feed stocks and is capable of rapid change from one to the other. Enrichment of lean gas is by natural gas only. The ICI lean gas process makes lean gas by passing superheated steam and desulphurised feedstock, either light petroleum distillate or natural gas, at a pressure, over a catalyst at temperatures between 750-800°C. The catalyst is contained in tubes in the reformer furnace and great care has to be taken to prevent sulphur poisoning of the catalyst. The resultant gases produced from the steam feed stock mixture which has passed over the catalyst is a mixture of hydrogen, methane, carbon monoxide, carbon dioxide and steam. This mixture passes over a further catalyst which produces a combination of carbon monoxide with the oxygen from the steam to produce carbon dioxide and hydrogen. This reaction reduces the carbon monoxide content of the gas to between 1 and 2 per cent and makes the gas non-toxic. The gas at this point contains a proportion of surplus steam and has to be cooled and dried, but after drying the lean gas is enriched to town gas quality of 500 British Thermal units per cubic foot by the addition of a proportion of natural gas. The gas produced in this plant does not have a characteristic smell of town gas made from coal and the gas must therefore be odourised to the statutory requirements using a substance which imparts to it a distinctive odour.

Members showed particular interest in the liquefied natural gas storage including the arrangements for the control of the 'boil off' from the natural gas storage tank and the refrigeration plant required to reliquefy this 'boiled off' gas. The natural gas itself when required for injection into the plant or into the supply mains is gasified by evaporation using steam heaters and the close control necessary in this process provoked considerable interest. The natural gas for this plant is of course brought from the Canvey Island terminal by road tanker.

The visit afforded members an opportunity of examining closely modern methods of gas manufacture and also provided an opportunity for the first time for members to observe natural gas in its liquefied form. The main impression produced by the plant was the cleanliness of the process and the complete absence of the nuisances which were formerly associated with coal carbonisation plant used for gas making.

At the close of the tour members were provided with tea and a most successful visit closed at about 4.30 p.m.

*J. H. Wyatt, Hon. Secretary.*

## West Midlands

"Dirty air could cost lives, but clean air can cost livelihoods" might almost have been the theme for the September meeting of the West Midlands Division of the National Society for Clean Air, held at the Royal Hotel, Ashby-de-la-Zouch. Mr. R. A. Blake, Industrial and Automotive Fuels Marketing Manager for the Midland Industrial Region of Shell-Mex and B.P. Ltd., welcomed the vice-chairman, Councillor Scrimshaw, and members of the Society. Mr. D. Williams, Liquefied Petroleum Gases Officer, introduced two films made by Shell-Mex and B.P. Ltd., "Environment in the Balance" and "Fuel for the 70's". The first, appropriately produced in Conservation Year, shows with the aid of some superb colour photography what man has done both to enhance and to spoil, our great inheritance, the British countryside. The second film sets out to show how liquefied petroleum gases are helping industry to lower costs, raise efficiency and at the same time clean up our air.

After a short question session, Mr. K. Fernie, L.P.G. Development Engineer, gave some background to the afternoon visit to the works of the Coalville Brick Company Limited. He explained how a small works that had for over 40 years produced high-quality facing bricks, were faced with serious problems in attempting to meet the requirements of the Clean Air Act. The cost of five new chimneys would have placed an unacceptable financial burden on the company. Shell-Mex and B.P. Ltd. had offered as a solution to this problem, liquefied butane gas as an alternative fuel to coal. Its clean burning properties and the absence of sulphur meant that the existing 30 ft. high chimneys would not need replacing.

After a buffet lunch, the party travelled by coach to Coalville Brick Works and saw first-hand how butane was successfully firing the kilns without smoke, grit or fume emission. The fact that butane had saved considerable expenditure on new chimneys was not the only benefit derived from the use of this new fuel. The 38 per cent increase in fuel efficiency resulted in lower fuel costs, while the cut in firing time of 55 per cent meant higher productivity. Better heat distribution within the kiln resulted in an even burn of the bricks from top to bottom in these down-draught kilns. Additional benefits included a 25 per cent increase in the compressive strength of the bricks and the almost total elimination of acid soluble sulphates that can cause surface flaking and premature discoloration of the bricks. The Clean Air Act that had seemed a threat to the very existence of a small company, had, in the end, proved to be beneficial.

After the tour of the works, Councillor Scrimshaw thanked both the Coalville Brick Company for conducting the party around the works, and Shell-Mex and B.P. Ltd., for their hospitality during the day.

*W. L. Kay, Hon. Secretary.*



# REVIEWS

## **The Health Education Council First Annual Report 1969-70**

*The Health Education Council, Lynton House, 7-12 Tavistock Square, W.C.1.*

The Chairman, Alma Birk, says in her introduction "with the gathering problems arising from the environment and the speed of technological change, the need for health education to be built in an extensive and mandatory manner into our health and social structures is of the greatest urgency . . . Two of the biggest problems facing our society are pollution and population growth".

Governments must be prepared to take a longer rather than a shorter-term view of health education, for it is vital not only socially and medically, but also economically.

The Council has already become recognised as a source of advice and help on health education matters and its influence is becoming increasingly apparent.

A comprehensive examination of present educational processes with the object of including within them education for personal preventive medicine would result in the health of the nation being continuously improved.

The Council realises reluctantly that its resources are too limited to meet all demands, but it can act as a catalyst for the expansion of health education by evolving sound principles based up research which will be made available to other bodies to encourage them to develop their work.

The Council is already acting broadly in accordance with many of the recommendations of the Report on Health Education (The Cohen Report, 1964). Brief details are given, divided into various headings.

The Report goes on to give details of the work of the Health Education Council, divided into the various subjects covered.

There is a section on training for health education, which states that doctors, dentists, nurses and other professions supplementary to medicine should include method as well as the content of health education in their curricula.

General developments within the Health Education Council are given plus a summary for the future.

The appendix includes a list of members and officers of the Council: the advisory panels and their members and examples of posters.

*Christine Smith*

## National Coal Board Report and Accounts for 1969-1970

*H.M.S.O., respectively 8s. 6d. and 19s.*

In 1969-70 the Board made an operating profit of £8.8 million but after paying interest charges of £37 million to the Government this resulted in a deficit for the year of £26.3 million.

The demand for coal during the year was notably high, but total production, at 147.4 million tons (a fall of 13.2 million tons from the previous year's total) was disappointing. This can be partly attributed to the effect of the heavy closure programme in 1968-69 and partly to the unofficial strike in October 1969, over the hours of work of colliery surface workers. Another reason for the fall in output was the slower rate of increase in productivity during the year. Output a manshift averaged 43.4 cwt, an increase of only 2.1% over last year.

Deep-mined output from the Board's collieries was 139.8 million tons, 13.2 million tons less than the previous year; production at opencast sites amounted to 6.6 million tons and from licensed mines and other sources, 1 million tons were produced.

As a result of the disappointing productivity advance and increases in expenditure, the Board were obliged to introduce, with the approval of the National Board of Prices and Incomes and the Government, selective price increases in October, 1969, and a general price increase in January 1970.

The Report states that the Government's White Paper (1967) on Fuel Policy underestimated the rate of growth of the total demand for fuel and the likely demand for coal. It states that current trends (sales demand was 10.5 million tons in excess of production for the year) suggest that the demand for coal in the 1970s will continue to be above the level suggested in the White Paper.

The Report continues that the substantial investment in mechanisation during the last ten years has already brought large returns, but further large benefits still remain to be won. This can be done by concentrating management effort on obtaining the best possible utilisation of the modern machinery now available. This, however, calls for the highest standards of management and of engineering expertise; for enthusiasm from the mine-workers and for the closest co-operation with the unions. Attention is being increasingly directed towards these ends as the Board is very conscious that the future prosperity of the industry depends upon success achieved in these fields.

The Board sold 20.2 million tons of solid fuel in the domestic market in 1969-70. Sales of bituminous housecoal fell by 1.7 million tons but sales of naturally smokeless and manufactured fuels increased to 4.7 million tons. The Report comments that "the extension of smoke control areas and the continued growth of the central heating market increased the demand for smokeless fuel and maintained the trend away from bituminous housecoal."

The number of installations of solid fuel central heating systems fell by 27,500 compared with the previous year, resulting from the deflationary trends in the economy. Roomheaters with high-output back boilers again proved to be the most popular installation.

*Christine Smith*



**Electricity in England and Wales**  
**Annual Report Electricity Council,**  
*H.M.S.O., 27s. 0d. net.*

**Annual Report Central Electricity Generating Board,**  
*H.M.S.O., 13s. 0d. net.*

During the year 1969-70 under review, the electricity industry in England and Wales supplied 168,230 million KWh to 18,271,086 million customers, an increase respectively of 7,961 million units and 235,845 customers. The income amounted to £1,460 million and expenditure £1,395 million, giving a net balance of revenue of £65 million, £36 million less than that of the previous year.

The net return on the average net assets amounted to 6·4 per cent, 0·7 per cent less than the previous year. The net assets at the end of the year amounted to £4,921 million, an increase of £166 million, and involving a capital expenditure of £402 million of which 77 per cent was financed internally.

The average price of electricity to customers was 1·895 pence per KWh, a decrease of 0·019 pence. The maximum output capacity at the end of the year was 46,857 MW, an increase of 2,184 MW, from 193 power stations, a decrease of 8.

Thermal efficiency of coal and oil fired stations was 28·30 per cent an increase of ·04 per cent. The works cost per unit supplied amounted to 0·7026 d/KWh (all stations) an increase of 0·0221 d/KWh.

The number of employees at the end of the year was 196,962, a decrease of 11,265.

Total sales of electricity increased by 5 per cent compared with 6·5 per cent in 1968-69. Off-peak sales increased by 22·1 per cent over the previous year. There was an increase of sales to industrial customers of 4·3 per cent. Sales of storage radiators by Area Boards increased by 18 per cent which together with those sold by other retailers added an estimated 1,509 MW to the connected off-peak load.

### *Generation*

The output capacity of new generating plants commissioned during the year was 2,779 MW sent out. At Fawley the first of the four 500 MW sets was commissioned. With the commissioning of the fourth 500 MW set at Eggborough in Yorkshire there are now three stations where all 500 MW units are in operation. The programme of 500 MW units will be completed in 1970 after which 660 MW sets will become standard. Three new stations are to be erected; nuclear stations at Heysham in Lancashire and Sizewell in Suffolk, and an oil fired station in the Isle of Grain, Kent.

Maximum demand on average cold spell had been estimated at 39,600 MW. On 8 January, 1970, the highest demand of the winter was experienced, estimated at 39,652 MW of which 38,153 MW was met with voltage and frequency reductions.

Developments in the coal industry have been of grave concern. The increase of 7s. 6d. per ton on East Midland coal in October 1969 and a general increase of 10 per cent in January 1970 will add some £35 million to fuel costs in a full year. Summer stocking of coal from unsuitable sources has contributed additionally to fuel costs.

Every attention is paid to the conservation of amenities and restriction of air pollution and in the current year the industry spent some £4 million for this purpose.

The Generating Board took from Southern Scotland 245 million units and from France 597 million units and supplied to Southern Scotland 821 million units and to France 2 million units.

### *Transmission and Distribution*

During the year the main transmission network of 275 KW or over owned by the C.E.G.B. was extended by 768 circuit units bringing the total length to 8,454 miles. Financial responsibility for certain 132 KV and 66 KV lines for primary distribution to Area Boards, was transferred to the Area Boards. Area Boards' distribution mains were extended by 4,857 circuit miles.

By the end of the year the number of customers receiving alternating current supplies outside the 230-250 volt range had been reduced to 165,569 representing about .9 per cent of the total customers. Less than 300 customers receive direct current supplies.

### *Research.*

Some £11 million to which the two Scottish Boards contributed was spent on research directed to generation transmission, distribution, and utilisation of electricity.

*A. J. Cousin*

## **The Gas Council, The Twenty-first Annual Report 1969/70**

*H.M.S.O. £1 0s. 0d.*

During the year 1969/70 the industry maintained its planned rate of progress towards the target of receiving and distributing 4,000 million cubic feet of gas a day by the mid-1970's. Sales of gas rose by 12.2 per cent to a record level of 5,264 million therms. In the industrial markets a feature was the development of supplies of gas on an interruptible basis. The appliances of over 1 million customers were converted to receive natural gas during the year. Plans were made for the construction of a third terminal to receive natural gas from the North Sea.

The industry earned a surplus of £13.7 million.

### *Financial Results*

The industry's gross surplus for the year was £102 million compared with £90 million in 1968/69. The net surplus after meeting interest payments was £13.7 million. This is the third highest surplus since nationalisation. Nine Area Boards made net surpluses totalling £16.7 million and three Boards incurred deficits totalling £3.0 million.



The average revenue per therm fell for each class of customer. Receipts from industrial sales showed a decrease of almost 2d. per therm, domestic revenue decreased by over  $\frac{1}{2}$ d. per therm, reflecting the effect of natural gas tariffs. All Boards showed an overall decrease in average revenue per therm of gas sold compared with 1968/69. The industry's financial objective for the period 1969/70-1973/74 will be a net return of 7 per cent on average net assets employed. The industry achieved a net return of 6.5 per cent on average net assets employed during 1969/70.

Capital expenditure during the year was £201 million. During the year Boards spent £51.4 million on conversion to natural gas.

### *Gas Supplies*

The aggregate quantity of gas available during the year was 5,744.2 million therms, an increase of 579.2 million therms over the previous year. In November 1969 the Council signed contracts with the Arpet Group and Mobil North Sea Limited for supplies of gas from the Lemnabank field. In October 1969 contracts were signed for the supply of natural gas from the Lockton field in Yorkshire, Home Oil of Canada Limited and Gas Council (Exploration) Limited each have a 50 per cent interest in the field.

The Council continued to participate through its subsidiary company Gas Council (Exploration) Limited, in off-shore seismic surveys.

Development of the terminal at Bacton, Norfolk, continued according to programme.

### *Transmission and Storage*

During the year 493 miles of the national transmission pipeline were completed giving a total system length of 1,565 miles.

The construction of facilities for storing natural gas in liquid form to meet seasonal variations in gas demand continued.

### *Gas Sales*

Total gas sales were 12.2 per cent higher than in 1968/69. Domestic sales increased by just over 11.7 per cent, due mainly to the consumption of central heating appliances and gas fires. Commercial gas sales were 5.6 per cent up and matched the sales target for expansion in this market. Total industrial gas sales were 18.7 per cent up on 1968/69 with Area Board's figures 10 per cent up.

### *Personnel*

The total number of employees in the industry at 31 March, 1970, was 119,475 comprising 60,434 manual workers and 59,041 staff employees. There was a reduction of 765 in the total.

### *Morton Report*

Professor Frank Morton, O.B.E., Professor of Chemical Engineering at Manchester University, was appointed to undertake an independent inquiry into the safety of natural gas. His report was published on 28 August, 1970. In the course of his conclusions, Professor Morton stated that natural gas can be stored, distributed and used with safety in correctly designed and properly maintained equipment. His conclusions and recommendations are currently being studied by the industry and by Government departments concerned.

*Suzanne Martin*

## **Quantitative Analysis of Gaseous Pollutants**

*Walter E. Ruch, 241 pp. (Not yet priced in U.K.)*

This book is designed quite successfully, to be a "quick reference source in the area of microchemistry of airborne gases and vapours". A wide range of compounds is listed alphabetically. For each compound is given a number of references, each followed by the concentration range to which the method is applicable, brief details of the method, sampling procedure and interferences followed by a few lines of critical evaluation, aimed at allowing the individual worker to decide whether the original work is worthwhile consulting.

There are three adverse criticisms to be made:—

- (a) It would be helpful to include the Analytical or Chemical Abstracts reference for each publication, since this work should be regarded as an adjunct to these.
- (b) For European readers it seems unnecessarily restrictive to limit the book's scope to English language sources, since most analysts are, or should be, familiar with at least French and German. However, foreign language papers are covered in the same author's "Chemical Detection of Gaseous Pollutants".
- (c) There are some gaps in the methods recommended for inorganic pollutants. No mention is made under "Organic Lead" of the use of atomic absorption, which is simpler for unskilled staff to use than the dithizone method. More serious is the complete omission under "Fluoride" of any reference either to the alizarin blue reagent of Leonard et al. or to more recent work using the fluoride selective electrode.\*

However, these criticisms can be set aside since this book does provide a quick clear source of references. It is easy to use and there is no excess verbiage. Any book which lightens the task of working through Chemical Abstracts in ten-, five- and one-year bites is to be welcomed. Experience shows that the most time consuming part of literature searching is finding the, often elusive, first reference, and this book provides this for a wide range of compounds.

\* N. T. Crosby, A. L. Dennis and J. G. Stevens. *Analyst* **93**, 643-652 (1968).

A. C. Turner

## **Environmental Health Report 1969**

*The Association of Public Health Inspectors, 5s. post free.*

This sixth annual report on environmental health, produced by the Association of Public Health Inspectors for the first time includes a section on Northern Ireland. This edition covers 705 local authorities.

The report points out that in the last decade food processing has developed in a way that makes it imperative to have a wider exchange of information and proper control over packing methods, temperature and humidity during distribution, storage and before sale.



Tables showing the number of animals slaughtered and prepared as meat are included.

The Association conducted an enquiry into the hygiene of poultry slaughtering establishments and discussions have been held on ways of improving public health control.

There is a section on foreign matter in food and the sampling of such food.

The report goes on to explain the difficulties of ventilation and working conditions in offices and shops.

Comments are made that the domestic smoke control policy was hindered towards the end of 1969 by the possibility of a shortage of solid smokeless fuels; this resulted in smoke control orders being deferred and the report points out that despite a fall in ground level concentration of smoke and sulphur dioxide, there is still much to be done to reduce these two common pollutants.

The report goes into the aspect of unsatisfactory housing conditions and has a number of tables relating to this. It then describes conditions at residential caravan sites and stresses that moving people from unauthorised sites and leaving them to find another place is no solution.

The problem of noise is also dealt with. Public cleansing is discussed.

The work carried out by Public Health Inspectors at international airports is also described.

The final section deals with work done in Northern Ireland which includes food control, working conditions, clean air, housing, caravans and noise.

*Suzanne Martin*

### **The Doomsday Book**

*Gordon Rattray Taylor, 335 pages, Thames & Hudson, 30-34 Bloomsbury Street, London, W.C.1. 42s. net in U.K.*

"Man has reached a turning point in his history. Up to now he has lived in a self epitomizing environment. Natural processes have kept him supplied with oxygen and water, with fertile soil, space to move, and even aesthetic pleasures, without the necessity of intervention or forethought on his part. Now he has reached the point where these autonomous natural processes can no longer cope with his demands. So it is not a question of whether he wants to assume control; he is obliged to." This book deals very comprehensively with the nightmare of modern technology. It is concerned not only with the population explosion and the pollution problem as a whole, but considers in detail the trends which have brought these things about.

"The Doomsday Book" deals factually with the various aspects of pollution and their effects, but rather less factually with the possibility of a future ice age or a heat death. It is extremely well written, eminently readable, and all the arguments are put forward in a very forthright and convincing manner. Although we cannot agree with all that the author postulates, there is no doubt that this book, dealing as it does, with the whole future of mankind will render a service to all thinking people in that it will cause them to think more, and we hope, take appropriate action for the future.

**W.H.O. Report No. 410 on Urban Air Pollution,**  
*Geneva 1969.*

The subject of air pollution is examined at a very high scientific level and indicates the need for a body to digest and publish their findings and calls for more research into the lesser known aspects of air pollution.

It is clear that the more gross forms of pollution are already being tackled and that considerable progress has been achieved. Naturally as the more obvious and serious hazards are tackled, the remaining problems become more abstruse.

The W.H.O. approach is obviously at a very high level and is employing some of the most responsible brains of our time; however, it is still necessary to continue the good work being done at practical, compromise and economic levels. Such practical work should not be held up pending pronouncements of the scientists as the work can always be modified in the light of future discoveries.

Pollution from road vehicles is regarded as a current problem. The need for international approach is stressed. While it is practical to achieve international uniformity, it is suggested that care should be taken not to delay individual progress on this account.

The Report indicates the trends in reduction of dusts and smokes with the increase in SO<sub>2</sub> (which is perhaps inevitable with the increase in the usage of fossil fuels).

Reference is made to the very little pollution from diesels other than smoke, but no mention is made of the simple engineering solution to the problem, requiring only legislation to put it into effect. There are some useful notes on the several pollutants from vehicles.

*P. Draper*

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**North Riding County Library**

The North Riding County Library have published a booklet entitled 'A Breath of Fresh Air'. It gives a detailed list of literature on pollution and conservation in the Library's stock and the first section covers books about man, his background, his evolution, his societies and the way in which he is constantly being changed by his natural habitat. In the second section, the books relate to the natural world and the way in which it has been altered by man throughout the ages. Each book has a brief description indicating its main theme and the approach, whether popular, scientific, or socio-economic. Other sections of the list give information on a selection of government and other agency publications and on societies which are concerned with pollution and conservation.



# INTERNATIONAL NEWS

## WEST GERMANY

Rapid industrial growth and strict enforcement of clean air regulations in West Germany are expanding the market for air pollution control equipment and instruments.

The German Federal Pure Air Law requires industrial installations to conform to established air quality standards, and is implemented by legislation and regulations of the various German states. Financing of air pollution control is aided by Federal tax relief measures and long-term credit at low interest rates.

Market research has indicated that annual expenditure on air pollution control equipment by German industry totals over £30 million. The study also reveals mounting interest by industry in air treatment within individual plants and a growing demand for dust free 'white rooms' in such fields as electronics, precision optics, and fine mechanism.

## SOUTH AFRICA

### **Air Pollution Research Group, C.S.I.R., Pretoria.**

The National survey of air pollution in South Africa which has been under way for more than 10 years was joined by two more cities during the year 1969. These were Bloemfontein and Klerksdorp. Bloemfontein installed four measuring stations and Klerksdorp erected one measurement site in the central area of the town and started with smoke measurements.

All the cities and towns conducting air pollution measurements send their results to the Air Pollution Research Group for analysis and publication. The data which is useful for the introduction of an air pollution control programme has been published in various reports. At a symposium held in Johannesburg during July, 1969, it was proved that the concentrations of smoke and sulphur dioxide in most of the South African cities which measure them, show the tendency to decrease. In the few cities where this was not the case, the increase in the levels of smoke and of sulphur dioxide, however, were small despite great industrial development and expansion.

Just published is the C.S.I.R. Annual Report, 1969-70.

### **A Federal Clean Car Incentive Programme.**

A Federal Clean Car Incentive Programme to spur development of a low-pollution car has been established by the Department of Health, Education, and Welfare according to Secretary Elliot L. Richardson.

To be administered by the National Air Pollution Control Administration (NAPCA), the programme is designed to stimulate private efforts to market a passenger car by the 1980's that will match the performance and convenience of the present day car, but whose power plant will be fundamentally pollution free.

The programme was established in response to President Nixon's February 10th Message on Environment.

The Federal Clean Car Incentive Programme offers graduated financial incentives in three phases: prototype, demonstration, and fleet test. Stringent requirements must be met by any vehicle accepted for entry into the prototype phase. Each prototype must demonstrate essentially pollution free characteristics, adequate road performance, and a potential for mass production.

Any vehicle successfully completing the first phase may be considered for the demonstration phase of the programme. In this phase, NAPCA will purchase 10 models of the vehicle to test under various operating conditions for several months. To enter this phase, a car must continue to meet the same rigorous standards for emission limits. Factors such as driveability, durability, safety, economy, and noise control will be carefully examined. Acceptance criteria governing these factors for vehicles entering this phase will be set by a Government board made up of representatives of NAPCA, the Department of Transportation, and the General Services Administration.

Vehicles successfully completing the Demonstration Phase may be considered candidates for entry into the Fleet Test Phase. For this phase, NAPCA will purchase some 300 models for lengthy, intensive testing in fleet use by selected Government agencies under typical driving conditions. During the last phase, each vehicle must show that its low emission features retain their effectiveness during prolonged use.

In Cambridge, Massachusetts, on the 24th August a Clean Air Car Race took place and Commissioner John Middleton of NAPCA announced that NAPCA were negotiating with the winners of the Clean Air Car Race to test their cars as it is thought from the race results that some of the cars have the potential for meeting the 1975 Federal emission standards. The overall winner of the race, a 1971 Mercury Capri, it is thought, will meet the standards considered for 1980 and it is hoped that all the cars which competed in the race can be brought into the Federal Clean Air Incentive Programme.



## NEW ZEALAND

### **Air Pollution. New Zealand Board of Health. Report Series No. 15. August 1970.**

A Committee was set up in 1968 to provide recommendations that dealt with three basic issues: (1) To recommend the criteria by which suitable air quality control objectives should be set; (2) to recommend measures which will effectively and economically achieve these objectives; (3) to recommend the form of organisation believed to be the most practicable for the administration of these measures.

An account of the present state of air pollution in New Zealand is given with details of recent history of air pollution control; existing pollution and its likely development; and existing air quality and legislation. Proposals for revised legislation are then given, 33 recommendations being made.

The main recommendation is that "a Clean Air Act which recognises air conservation as a guiding principle be enacted; the Act to be sufficiently comprehensive and flexible to meet changes in technology and public attitudes in so far as these can be foreseen." This Clean Air Act should be based on the requirement to adopt the "best practicable means" as defined in the United Kingdom Clean Air Act, 1956, as this concept combines flexibility with general acceptability. These means should be specifically defined by regulations or by a competent technical body with, in the latter case, appeal provisions similar to those at present available under the Health Act.

The proposed Act should provide for the setting up of a clean air council, consisting of not more than seven people, with advisory powers only. Details of proposed council functions are given. Recommendations of specifications to be incorporated in the proposed Act are given with regard to clean air zones, domestic and industrial air pollution and internal combustion engines—whether stationary or in transport vehicles, vessels or aircraft.

To ensure effectiveness of the Act the Committee recommends that fines should be substantial and that the chief air pollution control officer, or the local authority, with the approval of the clean air council, should have power to terminate a licence issued by them, but this be subject to appeal. The nuisance and emergency health hazard provisions should be retained separately in the Health Act but these rights should only be exercised after the procedures and remedies laid down in the Clean Air Act have been followed and used.

The legislation should include a schedule as well as a broad definition of air pollutants; a definition of premises to include vehicles, but exclude domestic premises except in clean air zones; a definition of scheduled process to cover all operations from receipt of raw material to dispatch of product; a definition of "best practicable means" which is based on the definition "practicable" in the British Clean Air Act.

It recommends that neither tax incentives nor subsidies be invoked to control air pollution, but that funds should be made available to the clean air council for encouraging development and evaluation of prototype equipment for air pollution control.

The proposed Clean Air Act should seek complete co-operation between Central Government agencies with their technical resources and the local authority officers with a large share of responsibility for implementation of control. The specialist function of the proposed Act should be allied with the general function of the Town and Country Planning Act—to ensure full development of a national approach to air conservation.

*Christine Smith*

### **Council of Europe. Countryside in 1970.**

The 3rd Conference of 'The Countryside in 1970' was a major British contribution to European Conservation Year 1970 launched by the Council of Europe in Strasbourg, France, early this year, in its 17 European member countries.

'Countryside in 1970' attended by HRH the Duke of Edinburgh, The Prince of Wales and the Prime Minister, Mr. Edward Heath, took place at the Guildhall, London, from the 26th to 28th October, 1970.

### **Car Exhaust Fumes.**

Lead content in the air has increased in recent years, particularly in towns and along roads. According to recent expert statements, air in the vicinity of the motorway south of Paris contains a lead concentration of 213 micrograms per 100 cubic metres whether the traffic is dense or not; in the last 7 years lead concentrations in the air of Zurich has increased 41 per cent.

At their recent meeting in Strasbourg, the Council of Europe's Committee of Experts on Air Pollution urged governments to step up scientific and technical research on the problems of pollutants in motor exhausts and on the means of reducing these emissions.

As a precautionary measure the experts addressed a pressing appeal to governments to decrease the quality of lead compounds emitted by motor vehicles or at least to prevent any further increases.

The experts' resolution will now go before the Council's Committee of Ministers.

## **SWEDEN**

According to the 'Conveyor' a publication of Steelcraft Corporation, a team of six Swedish scientists has developed a system to combat pollution and increase fuel supplies by producing methanol from refuse.

The system provides for burning refuse in furnaces, producing hydrochloric acid carbon dioxide. The acid would be washed away with water or neutralised with calcium while the carbon dioxide would be mixed with hydrogen to produce methanol.

Unusable refuse would be transported to a central installation for compaction into containers and then transported to furnaces for methanol production. Resulting fuel would be transported to garages by tankers.



# Air Pollution Abstracts

Abstracts of papers presented at N.S.C.A. Annual Conference,  
Southport, 1970.

**1198. Presidential Address.** Hutchison, Sir Kenneth. Mention is made of European Conservation Year and the International Conference to be held in Washington in December.

Much progress has been made in achieving clean air and there was a general acceptance in its benefits until now, most regrettably, a shortage of supplies of solid smokeless fuel has thrown doubts on the policy of the Society, incorporated in clean air legislation.

The author advocates gas and electricity for domestic use. The absurdity of levying purchase tax on gas fires should be apparent by now and this tax should go. Given such encouragement, the rate of voluntary conversion to clean air might well exceed what was being achieved by the rather slow machinery of the 1956 Act. However, if a further long delay is foreseen then there is a good case for amending legislation and administrative action.

The legislation in this country and the contribution made by industry towards achieving cleaner air is summarised, but the fact that much still remains to be done is stressed.

Industry has technical and economic problems, which require more research and the expenditure of a great deal of money.

One of the biggest problems in this country is pollution from petrol engined vehicles. Yet legislative action cannot be taken because we are told that there is as yet no direct medical evidence that the pollutants emitted are dangerous to health. But on the grounds of amenity alone, action should be taken now.

Another problem of increasing magnitude is the modern aircraft. This should be tackled early before it gets out of hand.

The National Society for Clean Air must move with the times and avoid the danger of becoming too involved with the problem of domestic smoke. It must get closer to industry and because it is not possible to disregard the effect of each part of the environment on the whole, it should support the efforts of the committee for Environmental Conservation and the Royal Commission as a means of ensuring co-operation between all interested bodies.

The Society must be technically sound in its own area so that should some form of confederation become desirable the Society will be able to speak with authority on the matters which are its concern.

**1199. The Clean Air Act 1968. (a) General Experience of the Working of the Act.** Sugden, F. G. The Clean Air Act of 1956 has been regarded as a strong and firm foundation upon which progressive legislative administrative action could be based. The passing of a further Clean Air Act in 1968 provides proof of this.

In this paper the principal measures contained in the 1968 Act are discussed together with what has been and is likely to be achieved in its implementation. Its apparent shortcomings were examined and finally some suggestions regarding possible future legislative requirements which could be desirable for dealing with the problem of the conservation of the atmosphere, were put forward.

**1200. The Clean Air Act. (b) The Measurement of Grit and Dust Emissions.** Short, W. The author's organisation, N.I.F.E.S. have carried out about 700 tests to determine grit and dust emissions from a wide variety of

boiler and furnace plants. The paper discusses the problems that have arisen with the equipment and with particular types of plant tested and shows how these have in most cases been overcome. A brief review of the present legal requirements is made and comments made on the form that the author feels should be taken by any future standards that might be laid down. Training courses are necessary for local authority staff, and the author gives a summary of a typical three-day course available using the B.C.U.R.A. cyclone and filter as a demonstration test equipment.

**1201. The Disposal of Refuse by Incineration.** Higginson, A. E. With growing emphasis on refuse incineration for the disposal of municipal waste the effect upon the environment must receive close attention.

The type of materials incinerated can produce noxious gases which unless stringently controlled can be a source of atmospheric pollution.

Local authorities are urged to set exemplary standards of gas cleaning to ensure good chimney effluents.

Methods of gas cleaning are discussed and the merits of electrostatic precipitators stressed. Effective instrumentation for automated control of incineration plants is regarded as a necessary design requirement.

**1202. Conservation. (a) Man and Environment.** Boote, R. E. To make wider choices we must develop education and information at all levels, promote better human relationships between the many fragmented sections of society and, perhaps above all, create an ethical concern for our environment. Recent achievements and progress at the national and international level are reviewed at the Conference to establish the success points on which to build and the failures to be resolved.

We are living in an environment of change with an increasing recognition of our new role as the main agents of change. Environmental management is one of our basic responsibilities. It will increase in importance as our powers, standards and choices grow. We are now at the start of the awesome task of managing our planet for

ourselves and posterity. To succeed we must have a revolution in attitudes. We must replace carelessness and selfishness with competence and concern and recognize the unity of our living world.

**1203. Conservation. (b) Conservation in the North West.** Jeeves, Stanley. The whole of this paper is directed towards individual responsibility in the protection and conservation of the environment. The author stresses how important it is that immediate action should take the place of words.

**1204 Conservation. (c) The Contribution Made by Clean Air.** Ross, A. I.

1. The substantial progress in clean air in England, the North West and Bolton is shown. Much remains to be done in the North West. It is possible that the north may yet achieve the very great reduction in air pollution of London.

2. An account is given of clean air development in Bolton.

3. Because smogs are fewer and less severe, there is not now an association between pollution, daily death rates and hospital admissions. Long-term effects of cleaner air are overshadowed by the effects of cigarette smoking. There is an evidence of a fall in cigarette smoking in men and deaths in middle-aged men from lung cancer have declined in recent years.

4. Cleaner air has produced a much better environment particularly in industrial areas. Plants grow better and buildings have been cleaned and will stay clean. Atmospheric visibility has improved.

5. The solid fuel prospects for next winter are discussed.

**1205. Clean Air—The Balance Sheet (a) Industry's Viewpoint.** Challis, E. J.

The advance of technology and the increase in demand for industrial production has caused the size, number and complexity of factories to increase significantly in the last ten years. A big technical effort, coupled with the expenditure of large capital sums, has been necessary within industry to hold pollution of the atmosphere in check.



Over the decade there are welcome signs that these efforts have achieved success; there is a reduced amount of smoke and other pollutants in the air around our major towns.

Economic forces are causing the erection of large single plants in place of a number of smaller units; examples are given of the way in which the intensified pollution problem from such large plants is being tackled.

The balance which an industrialist has to strike is one between cost of pollution control and the need to satisfy both legal standards and local standards set by the community. The industrialist accepts that his position as a member of the community gives him moral obligations to meet demands for cleaner air and a higher standard of living. He worries that the community will be unwilling to pay the extra product price needed to support these standards, and that other countries or other parts of the world with lower standards will price him out of the market.

Stress is laid on joint discussions and consultations between industrialists, community leaders and conservationists so that advances in pollution control which will prove acceptable to the community can be made at a reasonable cost to industry.

**1206. Clean Air—The Balance Sheet (b) The Domestic Viewpoint.** Kay, James. The paper discusses the benefits accruing from a clean air policy in terms of administrative, physical, social and economic benefits. It goes into the shortage on fuel supplies which have been one of the drawbacks and frustrations of a clean air policy and it concludes that the clean air investment policy is fully justified.

**1207. Clean Air—The Balance Sheet (c) The Health Balance Sheet.** Lowe, C. R. Smog episodes aggravate existing bronchitis and hasten the death of elderly patients suffering from chronic respiratory and cardiac disease. But such episodes have always been infrequent and are now so rare that they

make a negligible contribution to national morbidity and mortality.

Long-term exposure to urban atmospheric pollution has been clearly incriminated as an aetiological factor in cancer of the lung, otitis media in childhood, and bronchitis at all ages. Of the contributions of pollution to these diseases, the only one of any magnitude is the contribution to bronchitis.

Taking all evidence into account it seems likely that about one-sixth of the bronchitis in England and Wales may be attributable to urban atmospheric pollution. This is equivalent each year to about 5,000 deaths, the loss of 6½ million working days, £3½ million in sickness benefit and £3½ million in hospital, general medical and pharmaceutical services.

Since the Clean Air Act (1956) in London it is no longer possible to demonstrate any association between peaks in air pollution and excessive mortality or demand for hospital beds. Also since the Act death rates from chronic bronchitis in the conurbations have been declining. It is suggested that a possible explanation for the decline of mortality in the conurbations may be that the benefit of the Clean Air Act is outweighing the harmful consequences of the increasing consumption of tobacco.

**1208. Clean Air—The Balance Sheet (d) The Viewpoint of the Fuel Industries. (i) Solid Fuel.** Edwards, M. J. The paper makes a statement on the present difficulties; on what has been done for next winter and on the prospects for the next 3-4 years. It concentrates on the domestic market and only briefly mentions development in other markets.

It concludes that despite this year's problems, one can take comfort in the fact that disaster is just as much an imposter as triumph and from these difficulties will come the biggest single increase ever in solid smokeless fuel capacity; and this capacity the producers tend to operate to the full for years ahead.

**1209. Clean Air—The Balance Sheet (d) The Viewpoint of the Fuel Industries (ii) Gas.** Clegg, B. G. H. The Gas Industry considers that pollution is a crime and supports all measures against pollution of every kind.

The paper examines the achievements of the National Society for Clean Air but raises the question of sulphur dioxide and whether enough has been done about this pollutant. The interests of the Gas Industry are consistent with those of the Society.

Natural Gas will make an important contribution to clean air and sulphur reduction. The Industry would like to see it used particularly in new towns and cities and examines what gas can do to help in the domestic, commercial and industrial areas. The Gas Industry is a strong supporter of sulphur legislation and would like to see legislation introducing limits on the sulphur contents of fuels and also would like to see the chimney regulations extended and enforced, and regulations introduced concerning ground level sulphur concentration limits. Difficulty of total application should not be allowed to hold up legislation. In this respect it is considered that the 1970 Government's White Paper was too weak.

The use of liquefied natural gas is then considered and the paper concludes with the benefits that gas can bring to the clean air movement.

**1210. Clean Air—The Balance Sheet (d) The Viewpoint of the Fuel Industries (iii) Electricity.** Phillips, R. H. The balance sheet weighs heavily in favour of electricity as a source of heat, light and power in a clean air situation.

The paper considers the electricity supply industry, its use of fuels and the consequent cost of preventing air pollution. It then goes on to consider in more detail pollution control in power stations and the actual cost of this control. The balance sheet is then considered with regard to the contribution of the electricity supply industry.

By proper planning, pollution can be avoided and planning itself can contribute to full environmental control.

Air-conditioning and space and water heating are examined as are the requirements of industry, and finally a balance is struck.

**1211. Clean Air—The Balance Sheet (d) The Viewpoint of the Fuel Industries (iv) Oil.** Pearce, A. W. and Windebank, C. S. The paper reviews the types of pollution arising from the combustion of petroleum products and describes the efforts of the petroleum companies, both individually and in co-operation with others, to restrict this pollution. Limitations of pollutants is a responsibility shared between the petroleum supplier, the consumer and the manufacturer of consuming equipment, and for most pollutants the degree of elimination is a matter of cost which ultimately the consumer must meet. The research of the petroleum industry in this field aims at reducing this cost.

**1212. Pollution from Road Vehicles (a) Recent Developments in the Control of Exhaust Emissions from Petrol Engines.** Lindsay, R. and Thomas, A. The purpose of this paper is to provide a summary of the technical developments that have been recently taking place with respect to a developing pattern of legislation to limit emissions from petrol-engined vehicles, together with some background concerning questions of cost, maintenance and enforcement of such legislation.

**1213. Pollution from Road Vehicles (b) Pollution from Road Vehicles and Health.** Lawther, P. J. and Commins, B. T. After pointing out that this is an *aide-mémoire* on the authors' current views on pollution from motor vehicles, the paper goes on to consider methods of investigation of the problem and then to deal with the suspect pollutants in some detail. Hydrocarbons, smoke, oxides of nitrogen, aldehydes, sulphur dioxide, lead and carbon monoxide are dealt with at length and the paper concludes that there is little sound evidence by which pollution of the common air by motor vehicles can be shown to be especially harmful. This lack of evidence, however, should not be used to excuse either pollution or idleness in research. There is an urgent need to proceed with further investigations at the same time as those engaged in motor engineering strive to reduce pollution.



# GENERAL ABSTRACTS

**1214. Relationship of Automotive Lead Particulates to Certain Consumer Crops.** Schuck, E. A. and Locke, J. R. (Environ. Sci. Technol. 4 (4) 324-330, April, 1970). Presented at the Symposium on Air Conservation and Lead, Division of Water, Air and Waste Chemistry, 157th National Meeting, American Chemical Society, Minneapolis, Minn., April, 1969. The colorimetric dithizone technique was used to analyse cauliflower, tomatoes, cabbage, strawberries and valencia oranges for their lead content. The soil, water and air in contact with the crops were also analysed for lead. The combined findings from the edible portion of four of the five crops strongly suggest that automotive lead particulates are not absorbed. They exist rather as a topical dust coating of which at least 50% can be removed by simple water washing. Neither did these crops show any inclination to absorb lead through their root systems. Similar conclusions relative to strawberries cannot be drawn, except by analogy to the other crops. In spite of growing near heavily travelled highways, ie, up to 50,000 vehicles a day, the amount of lead associated with the five crops in an untreated state was never greater than one microgram of Pb per gram of fresh weight. The average Pb concentration of the entire crop areas studied was one or two orders of magnitude less than one microgram of Pb per gram of fresh weight.

**1215. An Evaluation of Seven Incinerators.** Achinger, W. C. and Daniels, L. E. (Pro. of 1970 National Incinerator Conference, May 17-20, Cincinnati, Ohio. 32-64). In an evaluation of seven incinerators that process municipal solid waste, data have been gathered on (1) the quality and quantity of solid waste processed, residue, and gasborne particulate emissions,

(2) the quality of the fly ash collected and the waste-water produced and (3) the economics involved in incineration. These data are compared and the study results summarised. The sampling procedures being used and the problems encountered during their evolution are also described.

**1216. A Systematic Procedure for Determining the Cost of Controlling Particulate Emissions from Industrial Sources.** Edmisten, G. and Bunyard, F. L. (J. Air Pollution Control. Assoc. 20 (7) 446-52, July, 1970). This paper presents a methodology for assessing the cost of controlling particulate emissions from industrial sources. A basic premise of the procedure developed is that the most meaningful approach to the evaluation of air pollution costs is based on the total cost of control annualised over the expected economic life of the equipment. By defining the size and efficiency of collection required, the degree of difficulty in installing the equipment, and knowledge of some of the characteristics of the involved process, gas stream, and pollutant characteristics, the cost of control can be estimated with the assistance of cost factors and guidelines presented.

**1217. Plant Response to Chronic Exposure of Low Levels of Oxidant Type Air Pollution.** Feder, William A. (Environ. Pollution I (I) July, 1970). Cultivars of geranium and carnation exhibit a reduction of side branching, a retardation of floral initiation, and a decrease in floral productivity when exposed daily for 5-7 hours to 0.1 ppm ozone for 1-3 months. These plants also exhibit a reduction in leaf size, an increase in internode length, a pro-

gressive destruction of leaf tissue and eventual defoliation in the case of geranium. Cultivars of petunia exposed to chronic low levels of oxidant are slower to flower and bear fewer flowers than those same cultivars grown in charcoal-filtered air from the same source. These plant effects are of special interest because they occur in the presence of pollutant levels encountered daily in areas surrounding US metropolitan centres.

**1218. Natural Gas and Hydrocarbon Hydrates.** Backhurst, J. R. and Harker, J. H. (J. Instit. Fuel, 405-6, October, 1970). The handling of natural and hydrocarbon gases under conditions of increased pressure has promoted considerable interest in the problem of hydrate formation. This short paper reviews the conditions under which the formation of hydrates is possible and suggests ways in which this can be avoided.

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## LETTER

*The Editor,*  
*Smokeless Air.*  
Sir,

May I take issue with Mr. Moffatt? The title of his article, "Clean Air—Are we going about it the right way", published in your last issue, is misleading. He selects only one Section of the 1956 Act, falls into the very trap the Minister (of Housing and Local Government, incidentally!) has studiously avoided so far, and by the title implies that the vigorous—and expensive—implementation of, for instance, Section 11 et seq., is not "the right way" to go about securing clean air.

In the United Kingdom, an accused person is innocent until proved guilty. Until an instrument for assessing smoke density in a chimney is produced which is foolproof, tamper proof and positive in operation beyond a shadow of doubt, it would prove virtually impossible to rely on such evidence in a British court of law. The instrument recommended by Mr. Moffatt, by his own admission, falls short of this standard.

The Ringelmann Chart is not, as Mr. Moffatt states, based on the colour of smoke; it is an aid—to the experienced eye—in the assessment of a degree of "darkness"—which is surely the same thing as light obscuration! Its use, for the purpose of the Clean Air Acts, throws the onus of proof squarely on the shoulders of the Local Authority. This is as it should be! Any observed contravention is invariably followed by a visit from the Public Health Inspector who, for his own sake, should ascertain whether any of the defences against his Authority are available and will, in 90 per cent of cases, be able to point the cause and the cure.

The operation of Section 1—indeed of the whole of both Acts—is a matter more of co-operation and encouragement than of enforcement. That it is not so "easy" to enforce, as Mr. Moffatt thinks desirable, is a virtue which other countries could do well to copy.

Yours truly,

R. A. NEWTON,  
*Senior Public Health Inspector.*

*Hambrook House,*  
*Porden Road, S.W.2.*



# SMOKE CONTROL AREAS

## Progress Report

Position at 30 September 1970

(Figures supplied by Ministry of Housing and Local Government)

	England	Wales	Scotland	Northern Ireland
<b>Smokeless Zones (Local Acts) in Operation</b> ...	44	—	—	—
Acres, 3,400 ...				
Premises, 41,060 ...				
<b>Smoke Control Areas in Operation...</b> ...	3,029	7	141	28
Acres, ...	789,153	1,097	74,873	7,579
Premises ...	4,080,912	4,979	353,299	9,943
<b>Smoke Control Areas Confirmed</b> ...	55	1	3	3
<b>Submitted</b> ...	56	1	4	2
<b>Grand Totals</b> ...	3,184	9	148	33

### Smoke Control Position in Regions of England at 30 September 1970

(Figures supplied by the Ministry of Housing and Local Government)

(1) Region	(2) No. of black area acres covered by smoke control orders confirmed or awaiting decision	(3) Percentage* of total black area acreage in region covered	(4) No. of black area premises covered by smoke control orders confirmed or awaiting decision	(5) Percentage* of total black area premises in the region
Northern ...	38,823	31.0	160,064	28.9
Yorkshire and Humberside ...	185,440	49.2	614,595	52.6
East Midlands ...	63,807	23.8	188,953	36.9
Greater London ...	238,752	73.0	2,114,136	80.1
North Western ...	195,814	48.8	811,449	47.7
West Midlands ...	82,886	33.3	374,580	35.6
South Western ...	7,505	28.5	28,697	19.3
Total (black areas) ...	813,027	45.8	4,292,474	55.2
Outside black Areas ...	1,063,544		3,338,956	
<b>Grand Totals</b> ...	<b>1,876,571</b>		<b>7,631,430</b>	

\* The percentage shown in columns (3) and (5) above are percentages of the total acreage and of the total number of premises in the black areas concerned. In practice it may not always be necessary for the whole of the black area authority's district to be covered by smoke-control orders (e.g., there may be some areas of open country).

**Note:** The number of premises covered by smoke control in the last quarterly return for the Greater London Region should read 2,101,335 and not 101,335 as given in error.

**Erratum:**—Clean Air Year Book 1970-71

In the newly published edition of the above book Warrington Rural District was omitted from the information regarding Smoke Control by Authorities outside the Black Areas (pages 75 and 76).

The entry should be as follows:—

	Acreage	Premises
“Warrington RD	2,267	1,442

# New Smoke Control Orders

The lists below are supplementary to the information in the last issue of *Smokeless Air* (Autumn 1970) which gave the position up to 30 June 1970. They now show changes and additions up to 30 September 1970.

Some of the areas listed are new housing estates, or areas to be developed for housing. The total number of premises involved will therefore increase. An asterisk denotes that there have been objections and that a formal inquiry has been or will be held.

The list of new areas in operation of smoke control is based on the plans submitted to the Ministry of Housing, but may erroneously include some local authorities who have made postponements, without notifying the Ministry of the fact.

## ENGLAND NEW SMOKE CONTROL ORDERS IN OPERATION

### Teesside

Teesside C.B. (Glebe Estate, Norton).

### Yorkshire

#### *West Riding (North)*

Morley B. (Nos. 40 and 41).

#### *West Riding (South)*

Barnsley C.B. (No. 13). Rotherham C.B. (Richmond Park No. 1).

### North Western

#### *South Lancashire and North-East*

##### *Cheshire*

Bolton C.B. (Moss House Farm and Hillside). Salford C.B. (No. 22). Eccles B. (No. 12). Prestwich B. (No. 9). Crompton U.D. (No. 5). Tottington U.D. (No. 2). Oldham B. (No. 16).

##### *Central Lancashire*

Oswaldtwistle U.D. (No. 1). Barrowford U.D. (No. 3).

### Merseyside

Bebington B. (No. 20 Stage 3).

### Midlands

#### *East Midlands*

Northampton C.B. (Nos. 1 and 2).

### West Midlands

Aldridge Brownhills U.D. (No. 32). Warley C.B. (No. 9).

### London

#### *Greater London Boroughs*

Ealing L.B. (Nos. 46, 47 and 48). Westminster L.B. (Wild Street).

### Local Authorities outside the Black Areas

Glossop B. (No. 4). Ramsbottom U.D. (No. 3). Todmorden B. (No. 8). Rawtenstall B. (No. 1). Thurrock U.D. (No. 7).

## NEW SMOKE CONTROL ORDERS CONFIRMED BUT NOT YET IN OPERATION

### Northern

#### *Tyneside and Wearside*

Blaydon U.D. (No. 3). Tynemouth C.B. (No. 11). Newburn U.D. (Nos. 12 and 13).

### Teesside

Hartlepool C.B. (No. 19).

### Yorkshire

York C.B. (No. 2).

#### *West Riding (North)*

Huddersfield C.B. (Marsh-Grimiscar). Ripley U.D. (No. 2/1970). Halifax C.B. (No. 17). Leeds C.B. (No. 85). Sowerby Bridge U.D. (No. 9). Horsforth U.D. (No. 29 (a) and (b)).

#### *West Riding (South)*

Barnsley C.B. (No. 12).

### North Western

#### *South Lancashire and North-East* *Cheshire*

Failsworth U.D. (No. 9). Royton U.D. (No. 6). Eccles B. (No. 14). Salford C.B. (No. 17). Little Lever U.D. (No. 1). Altrincham B. (No. 9). Urms-ton U.D. (No. 10). Stalybridge B. (Mottram Road, etc. 1970).

### Merseyside

Runcorn U.D. (Nos. 4 and 6). Ellesmere Port (No. 10). Bebington B. (Nos. 21 and 22). Wallasey C.B. (No. 15).



## **Midlands**

*Derby, Nottingham and Chesterfield*  
Arnold U.D. (No. 4). Mansfield B. (No. 6). Belper R.D. (Nos. 3).

### *West Midlands*

West Bromwich C.B. (Nos. 18 and 19). Halesowen B. (No. 32). Aldridge Brownhills U.D. (No. 33).

### *Potteries*

Stoke-on-Trent C.B. (No. 24). Kidsgrove U.D. (No. 18).

## **London**

### *Greater London Boroughs*

Bromley L.B. (No. 12). Barnet L.B. (No. 11). Wandsworth L.B. (No. 4). Harrow L.B. (No. 22). Lambeth L.B. (No. 24). Hillingdon L.B. (No. 15).

## **Local Authorities outside the Black Areas**

Canterbury C.B. (Downs Road No. 1, Westgate No. 2, Tennyson No. 3). Exeter C.B. (Pennsylvania No. 1). Staines U.D. (No. 11). Blaby R.D. (No. 6). Southampton C.B. (No. 10). Oxford C.B. (No. 10). Whiston R.D. (Rainhill No. 1). Rugby B. (No. 13). Warrington C.B. (No. 15). Winsford U.D. (No. 10).

## **NEW SMOKE CONTROL ORDERS SUBMITTED BUT NOT YET CONFIRMED**

### **Northern**

#### *Tyneside and Wearside*

South Shields C.B. (Nos. 5 and 6).

#### *Teesside*

Hartlepool C.B. (No. 20).

### **Yorkshire**

#### *West Riding (North)*

Leeds C.B. (Nos. 86 and 87). Wakefield C.B. (Plumpton No. 1 and Central Area No. 3). Brighouse B. No. 18. Horbury U.D. (No. 8).

#### *West Riding (South)*

Sheffield C.B. (No. 18). Darton U.D. (No. 14). Hoyland Nether U.D. (No. 1).

### **North Western**

#### *South Lancashire and North-East Cheshire*

Bury C.B. (No. 8). Stockport C.B. (Heavily/Hillgate 1970). Blackrod U.D. (No. 2). Kearsley U.D. (No. 4). Westhoughton U.D. (No. 6).

#### *Central Lancashire*

Burnley C.B. (No. 12). Preston C.B. (No. 22). Darwen B. (Nos. 6 and 7). Nelson B. (No. 6). Church U.D. (No. 6).

## **Merseyside**

Birkenhead C.B. (No. 7). Bootle and Litherland (No. 1/1970).

## **Midlands**

*Derby, Nottingham and Chesterfield*  
Mansfield B. (No. 7). Sutton-in-Ashfield U.D. (No. 1/1970).

### *West Midlands*

Wolverhampton C.B. (No. 14). Sutton Coldfield B. (No. 19).

## **London**

### *Greater London Boroughs*

Croydon L.B. (No. 12). Merton L.B. (No. 17). Richmond upon Thames L.B. (Twickenham No. 11). Ealing L.B. (No. 49). Harrow L.B. (No. 23). Barnet L.B. (No. 12). Hounslow L.B. (Heston and Isleworth, Nos. 19, 20 and 21).

### *Outer London*

Dartford B. (No. 10).

## **Local Authorities outside the Black Areas**

Blackwell R.D. (No. 1). Cheshunt U.D. (No. 6). Stanley U.D. (No. 4 Yorks.). Winsford U.D. (No. 11). Warrington C.B. (Nos. 14 and 16). Sadleworth U.D. (No. 2). Luton C.B. (No. 8). Hazel Grove and Bramhall U.D. (No. 6). Todmorden B. (No. 9). Darlington R.D. (Newton Aycliffe Nos. 5 and 8; School Aycliffe No. 9). Peterborough C.B. (No. 2). Skelmersdale and Holland U.D. (Nos. 6 and 7). Rawtenstall B. (No. 2).

## **SCOTLAND**

## **NEW SMOKE CONTROL ORDERS CONFIRMED BUT NOT YET IN OPERATION**

Midlothian County (Livingston New Town No. 2). Dundee (Downfield East). Port Glasgow (No. 5).

## **NEW SMOKE CONTROL ORDERS SUBMITTED BUT NOT YET CONFIRMED**

Falkirk (No. 9). Glasgow (Kelvin-side). Port Glasgow (No. 6). Renfrew County (New Erskine Community).

## **NORTHERN IRELAND**

## **NEW SMOKE CONTROL ORDERS IN OPERATION**

Hillsborough R.D. (No. 2). Londonderry Dev. Comm. (Nos. 1 and 2). Newtownabbey U.D. (No. 3). Newtownards B. (No. 1). Portadown B. (No. 4).

**NEW SMOKE CONTROL ORDERS  
SUBMITTED BUT NOT YET  
CONFIRMED**

Londonderry Dev. Comm. (No. 3).  
Portadown B. (No. 5).

**ORDERS SUSPENDED**

We regret to announce that since the last issue of *Smokeless Air* the following additional local authorities have been granted orders by the Ministry of Housing and Local Government to suspend the operation of their existing smoke control orders because of the present shortage of solid smokeless fuels.

*12 August 1970-30 April 1971*  
Dukinfield (Armada No. 8).

*1 September 1970-30 April 1971*  
Todmorden B. (No. 8). Saddleworth U.D.C. (No. 1). Irlam U.D. (Cadishead No. 1 and Irlam No. 2).

*2 October 1970-30 April 1971*  
Bristol (Nos. 6, 7 and 8).

*1 November 1970-31 March 1971*  
Greenwich (Abbey Wood; Abbey Estate; Abbey Wood (Nos. 2 and 3); Charlton; Clothworkers' Wood; Garrison (North); Glyndon; Glyndon (Nos. 2 and 3); Greenwich (No. 4); Plumstead; Rockmount, Shooter's Hill; St. Mary's Re-development Area; St. Mary's (Nos. 2, 3 and 4)). Bolton (East Ward; Crook Street; Queens Park; School Hill; Beverley Road; Deane; extension of Brightmet Neighbourhood Unit; extension of Crumpsall Street Estate; extension of Leonard Street Estate; extension of Lever Edge Lane; Greenland Road; Radcliffe Road; Ashworth Lane; Hulton; Rumworth; Lever Edge Lane South; Heaton; Monkland Hill and Ivy Road.) Deptford (Nos. 1-3); Lewisham (Nos. 2-9 and 19); Lambeth L.B. (Nos. 1-12 and 15 and 17); Wimbledon (Nos. 1-4); Merton and Morden (Nos. 3-6); Merton L.B. (Nos. 3-5); Haringey L.B.

(Tottenham 4-8; Wood Green Nos. 4, 7, 8, 9 and 10.) Hounslow L.B. (Brentford and Chiswick No. 7; Heston and Isleworth Nos. 11 and 12); Brentford and Chiswick B. (Nos. 1-6); Heston and Isleworth (Nos. 1-7); Harrow L.B. (Nos. 1-8); Havering (Hornchurch Nos. 2-5); Heywood B. (Nos. 1-4); Croydon L.B. (Nos. 1-5 and Part of Croydon Nos. 8 and 9).

*1 November 1970-30 April 1971*  
Nelson B. (Nos. 1-5). Warrington C.B. (Nos. 1-6). Queensbury and Shelf U.D. Bredbury and Romiley (Nos. 1-3). Huyton-with-Roby U.D. (Nos. 1-3). Widnes B. (Nos. 1-3). Wilmslow U.D. (all areas declared). Blackburn (Nos. 1-3). Wakefield (Central Area No. 2; Alverthorpe No. 1; Kettlethorpe No. 1; Eastmoor No. 1; Sandal, Nos. 1 and 2.). Hindley U.D. (all areas declared). Radcliffe B. (all areas in operation). Royal Leamington Spa (Nos. 5-8). Crompton U.D. (Nos. 1 and 2). Failsworth U.D. (all orders). Newburn U.D. (Nos. 1 and 2). Royal Borough of New Windsor (any order in operation). Colne (Nos. 1-7). Wigan (Nos. 1-3). Pontefract B. (all orders in operation). Barrowford U.D. (all orders in operation).

*1 December 1970-31 March 1971*  
Royton U.D. (all areas declared).

*1 December 1970-30 April 1971*  
Kingston-upon-Hull (No. 2).



# INDUSTRIAL NEWS

## **Order for Gas Cleaning Plant for Steelworks**

An order valued at approximately £400,000 has been placed with W. C. Holmes & Co. Ltd. by the Tubes Division of the British Steel Corporation. The order is for gas cleaning plant to be installed on the main exhaust from a new 10 foot wide sinter strand for their Corby Works.

The main section of the gas cleaning plant is a three-field electrostatic precipitator designed to handle 690,000 cfm of exhaust gas, and to give an outlet dust burden not exceeding 0.05 grains per cubic foot of dry gas at NTP.

## **Personnel Director Retires**

Mr. W. H. Moys, who has been the Personnel Director of the Gas Council since 1968, has retired.

Mr. Moys, who is succeeded by Mr. R. L. Worsfold, was responsible for advising the Council on manpower, training, management, development, personnel policy for the industry and industrial relations at national level.

Mr. Moys, B.Sc.(Eng.), M.Inst.C.E., A.K.C., F.I.Gas.E., M.Inst.F., M.I.P.M., began his career in the gas industry as an engineer and after attaining the position of Group Engineer he was appointed Staff Controller of the North Thames Gas Board in 1956. He joined the Gas Council as Head of Industrial Relations in 1966 and was subsequently appointed Personnel Director.

## **Design Awareness Promoted by Domestic Appliance Manufacturers**

Recognition of the need for good design in all fields of consumer durables has prompted a major British manufacturer to institute a design award for products made within its group.

The company, Radiation Limited, manufacturers of a wide range of domestic appliances, catering equipment and engineering products, believe that this is the only design award made internally by any company in Britain. Eight Radiation companies entered products for this first award.

Winner for 1970, the inaugural year's award, is Ascot Gas Water Heaters Limited, with their Ascot 304 balanced flue water circulator.

The Ascot 304 was among twenty-five appliances submitted for the award which were introduced by Radiation group companies during 1969.

## **Environmental Engineering—Simon Engineering Review 13**

Clean air, water treatment, and land use are three aspects of environmental engineering with which the companies of Simon Engineering Ltd are involved, and which are discussed in the new issue of Simon Engineering Review, published to mark European Conservation Year.

# interested in a Clean Air Campaign or house improvement scheme?



## EXHIBITION

A complete pre-fabricated and self-contained "Clean-Air" Exhibition; adaptable in size with one, two, three or four approved smokeless appliances under fire, and displays of the smokeless fuels available in the district; also a self-contained exhibition unit for use with House Improvement Schemes.

## MOBILE UNITS

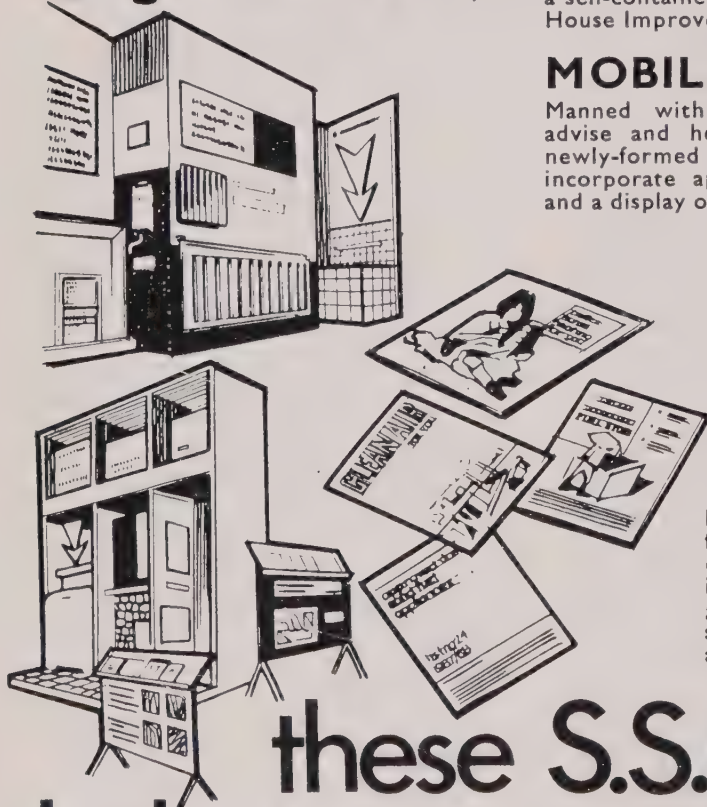
Manned with technical demonstrators, to advise and help residents in proposed or newly-formed Smoke Control Areas. They incorporate approved appliances under fire and a display of the solid smokeless fuels.

## DISPLAYS

A range of portable units variously displaying instructional panels dealing with Clean Air and the Act, House Improvement Schemes, a typical central heating unit, fuel displays and literature displays.

## LITERATURE

Informative literature is available free for Local Authorities to distribute to the public, explaining the Clean Air Act, and giving full information on solid smokeless fuels and the appliances.



# these S.S.F.F. aids help to create the right Atmosphere

The comprehensive services offered free by the Solid Smokeless Fuels Federation can make an invaluable contribution to "Clean Air" campaigns, the implementation of Smoke Control Areas, and the organisation of House Improvement or Conversion schemes.

Local Authorities who are interested in utilising the aids shown above are invited to apply to the address below.

**SOLID SMOKELESS FUELS FEDERATION**

York House . Empire Way . Wembley . Middx



## **Largest Incineration Plant for Coventry**

Following their recent successes with municipal refuse incineration plant contracts for the cities of Exeter and Birmingham, Head Wrightson now have a letter of intent for a similar but larger plant to be installed in another of Britain's big cities—Coventry. Subject to approval from the Ministry of Housing and Local Government, Head Wrightson Process Engineering Limited of Thornaby, Teesside, will design and install a municipal refuse incineration plant of the latest type, capable of handling up to 36 tons of refuse per hour.

The Coventry plant will incorporate three Head Wrightson/Martin reciprocating grates, each able to burn up to 12 tons of refuse per hour. Made under licence from Josef Martin Feuerungsbau of Munich, this advanced type of grate is widely used on the Continent but is exclusive to Head Wrightson in the United Kingdom. The unique reciprocating action of the grate performs the triple functions of drying, heating to ignition and burning. Refuse is kept burning constantly, reducing the volume by 90 per cent, and discharging a small odourless clinker suitable for road-making and land-fill.

An outstanding innovation in the Coventry plant is its waste heat utilisation system, designed by Head Wrightson combustion engineers at Thornaby. The hot gases arising from the burning refuse are cooled by means of special boilers, which generate large quantities of steam. A mere 10 per cent of this steam is sufficient for steam-driven turbines to provide power for almost all the plant's needs. Electrical requirements would otherwise amount to approximately 25 kilowatt hours for every

ton of refuse burnt. The remaining 90 per cent of the steam is readily available for other uses outside the plant, and can be very simply exported for a large-scale district heating system, or for process steam in industry.

## **Baxi Gas and Solid Fuel Central Heating at Farnworth**

All the 172 new homes on the Highfield Road, Farnworth, Bolton, Lancs. estate will have central heating by Baxi appliances, but half are gas and half solid fuel. Farnworth Corporation decided to divide their new estate equally between the two types of heating, one complete half of 86 houses having the Baxi Bermuda gas fireside central heating unit and the other half having Baxi's underfloor draught open fire, the Burnall, with radiator output boiler.

The back boilers with both appliances will provide domestic hot water and supply four radiators. Work on the new estate began in July 1969 and is due to finish in July 1971.

## **Order for Gas Cleaning Plant for Refuse Incinerator**

An order valued at more than £120,000 has been placed with W. C. Holmes & Co. Ltd. by Redman Heenan Froude Ltd. for gas cleaning plant for the incinerator which Redman Heenan Froude are supplying to the County Borough of Blackburn to deal with 170 tons of refuse per day.

The plant comprises a conditioning tower to reduce the temperature of the flue gases from a peak of 2,000°F. to 570°F. followed by a two-field electrostatic precipitator designed to give an outlet dust burden not exceeding 0.05 grains per cubic foot of dry gas at NTP.

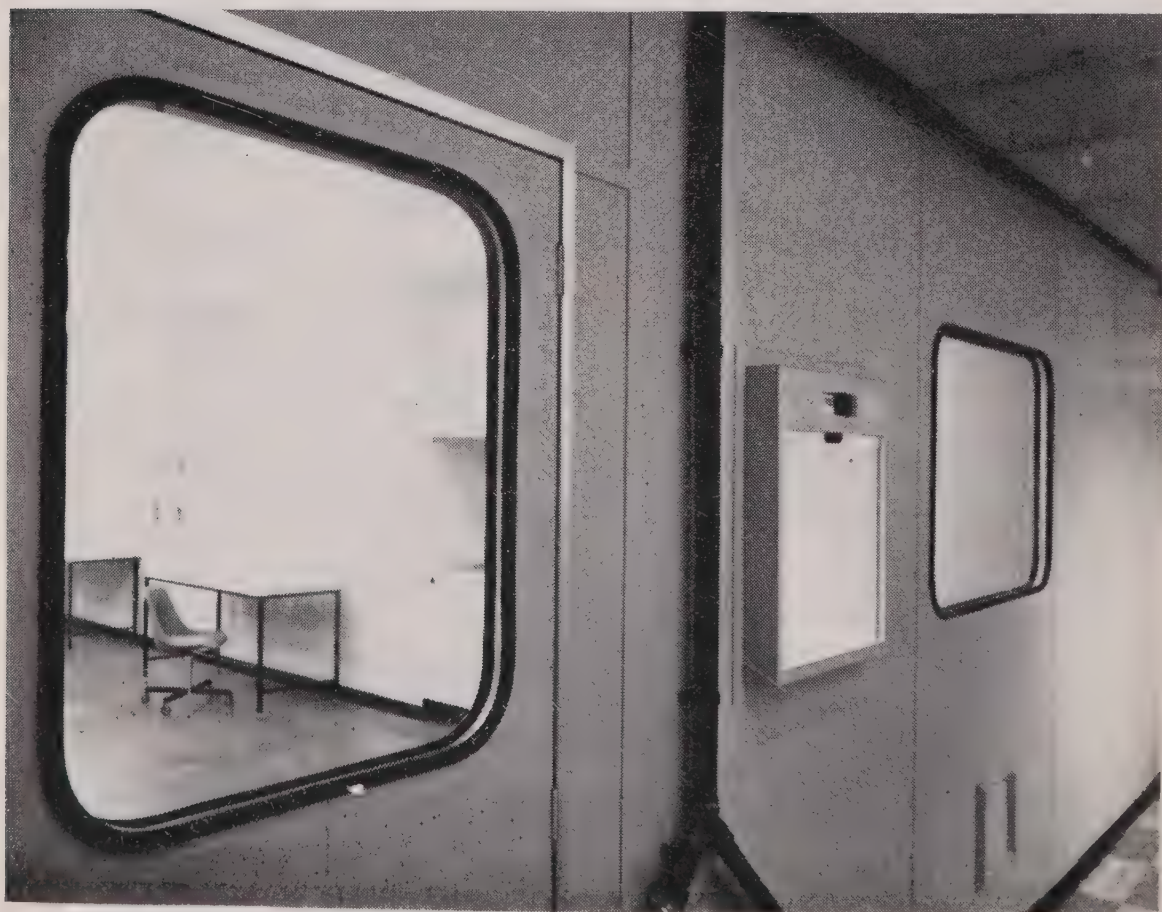
## Warerite Meets Exacting Standards in Clean Air Room

Hepaire Filtration, the Crawley-based manufacturer of clean air equipment, has recently completed the fabrication and fitting of a clean air room at the Oxted, Surrey, works of International Rectifier (GB). Standard wall panels are a feature of the Hepaire clean air rooms, the modular construction facilitates easy erection and any subsequent dismantling. A large range of materials—from aluminium sheet to Warerite decorative laminates—may be bonded to the basic timber frame.

A total of 80 sheets of 3,050 mm × 1,220 mm (10 ft. × 4 ft.) Ware-

rite Crayon Green decorative laminate have been used in the Oxted room, which has been designed to exacting standards to enable the company to manufacture and assemble electronic components in a controlled environment.

As well as containing manufacturing and assembly equipment, the room has specialised equipment designed specifically for use in a clean air environment. In common with the walls and partitioning, this equipment is surfaced with Warerite. With its tough, easy to clean, crevice-free surface Warerite is an ideal cladding material for all applications where hygiene and purity are at a premium.



Clean Air Room



## **New X-ray Analyser Can Help to Reduce Pollution**

Applied Research Laboratories Limited, with financial support from the National Research Development Corporation, has developed a range of X-ray analysers designed to meet the need for an inexpensive and reliable instrument which can be used for many types of routine laboratory analysis or in on-line process control applications. A major oil company is currently evaluating the instrument for the analysis of sulphur in fuel oils, an application which alone could lead to orders for several hundred instruments in view of the growing concern throughout the world about the effects of atmospheric pollution. Pollution of the environment can also be prevented by the monitoring of effluents being discharged into rivers, lakes or the atmosphere.

## **G.W.B. Boilers Appoint North Eastern Representative**

Due to the increased marketing activities of G.W.B. Boilers Limited of Dudley, they have appointed Mr. A. Darbyshire Technical Representative for the North East of England.

## **National Air Pollution Control Administration America**

Dr. Bernard J. Steigerwald has been named Associate Commissioner of the National Air Pollution Control Administration. Dr. Steigerwald will supervise manpower development, technical information, and research grant programmes for the agency, and serve as officer in charge of NAPCA's technical centre in Research Triangle Park, North Carolina, which is under construction.

## **New Car Engine—Economic to run with low pollution potential**

A new and promising car engine has been designed by Glenn B. Warren, a 75-year-old American, who prior to retirement 10 years ago, was vice-president in charge of General Electric Company's steam turbine division. The new engine's exhaust would be low in pollutants and although so far only exists on paper and in computer studies, the United States National Air Pollution Control Administration has been working out details of a contract with Mechanical Technology Inc. of Latham, New York, that could lead to experimental hardware a year from now.

In scientific principle, the engine is similar to a gas turbine, though there is no physical resemblance as in Warren's engine the compression is done by a bank of pistons, the hot air and fuel are combined in a separate combustion chamber, and the combustion gases then expand into a second bank of pistons; these turn the driveshaft.

Another asset to the engine is that it is remarkably high in fuel economy and could be manufactured with a minimum of retooling by the car industry.

## **Appointments at Carron**

The Directors of Carron Company (Holdings) Limited have appointed Mr. John Lambie, Managing Director of Carron Company, Falkirk, Scotland. Mr. H. C. Wilson Bennetts who has acted as Chairman and Managing Director of Carron Company will remain Executive Chairman of the Company. Mr. Ian Cadell has joined the Board of Carron Company.

## **Top U.S. Award for British Made Pollution Monitor**

For the third year in succession one of the products marketed by Pye Unicam Ltd of Cambridge has received America's most coveted technological award, the IR 100 Award. This is presented annually by the Industrial Research Corporation of America for the top 100 technological achievements in a particular year, and normally goes to a product manufactured outside the U.S.A.

The product that has won this coveted laurel is the Phillips Sulphur Dioxide Monitoring System, which has been hailed as a breakthrough in air pollution monitoring equipment.

## **Amateurs Attack Air Pollution**

An army of amateur scientists attacking air pollution. Sounds a bit Jules Verneish, doesn't it? But that's what is being planned by the Open University. Apparently all students taking the first-year science course will be supplied with 'home experiment kits' which will serve the dual purpose of carrying out a nationwide pollution survey and being available for other elementary experimental work. The university say that there will be 8,000 people feeding data into a central computerized analysis centre from air samples taken on people's own doorsteps. Next time you get home have a look at your neighbour's doorstep. If he's showing a 'mini-lab' (its their description, not ours), then he's one of them and should go up in your estimation, as they will certainly be producing something of value.

## **New Particulate Sampler**

Epsilon Industries Ltd. is to market a new automatic sampler which will cut the cost and increase the efficiency of obtaining specimens and analysing dirt in the atmosphere. This includes accumulations of very fine particles which form a hazard to health\* when carried deep into the lungs by inhalation.

In summary main advantages of the new Air Particulate Sampler are \* Reduces cost of sampling \* Only sampler capable of automatic unattended operation \* Only sampler which will compute, print and translate results \* Accuracy of 1 per cent on reflection readings \* Gives digital readout.

Now being used in North America for professional data collection, the sampler can be employed in factories and on sites where dust may result in a lowering of workers efficiency or impair their health in, for example, areas where asbestos is worked.

## **IMI and Gas Council in Big Deal**

As a result of a multi-million pound deal with the Gas Council, seven sites of Imperial Metal Industries Ltd. will use about 35 million therms of natural gas a year at locations in different parts of the country.

Gas was chosen because of its competitive price, its clean combustion characteristics and easy controllability.

The Gas Council's Marketing Division negotiated the deal centrally on behalf of, and in co-operation with, the West Midlands, North Western and North Eastern Gas Boards.

Each Board will now sign separate five-year contracts with IMI covering the works in its area.





Wall heater fitted in a modern kitchen without obstructing work surface or floor space

### **H.T.M. 75 Officially Launched— Abergas Breakthrough Now on the Market**

The revolutionary H.T.M. 75, developed by Abergas and already the cause of considerable speculation and publicity, made its official appearance on the U.K. market on 27 October. The launching took place at Painters Hall, London.

The H.T.M. 75 is the product of aero space research and is the first GAS central heating appliance to be specifically designed for natural gas. From the consumer point of view, it provides a gas boiler for central heating systems which measures only

21in × 17¼in × 11¾in, can be fitted anywhere—under a sink, in a cupboard or garage, for example—as long as it is fixed to an outside wall, is absolutely safe, with no pilot light to go out—ignition is electronically controlled, cheaper to buy than any other gas boiler of its type and output and certainly cheaper to run by a spectacularly fast “warm-up”.

### **New Editor for Town and Country Planning**

Mr. Ian Lyon has been appointed the new Editor for the monthly journal *Town and Country Planning*.

### **New Director for British Standards Institution**

Mr. G. B. R. Feilding, distinguished engineer and Fellow of the Royal Society, assumed leadership of the British Standards Institution on 7 September, 1970. Mr H. A. R. Binney, whose retirement from the post of director-general was announced earlier this year has agreed to contribute his considerable experience in international technological agreements and will continue to work with BSI as director-general, international. He will specialize entirely in this field.

### **New General Manager for D & I**

Designs & Installations Limited have appointed a new General Manager—Mr. Brian Rusling who has had wide Trans-Atlantic experience of research into special purpose machinery.

### **United Nations Announce the Appointment of Mr. Strong of Canada as Secretary-General 1972 Human Environment Conference**

On 15 December 1969 the General Assembly adopted resolution 2581 (XXIV) on the subject of the United Nations Conference on Human Environment. The resolution established a preparatory committee to advise the Secretary-General, and the Secretary-General was requested to set up a small conference secretariat and to appoint at the appropriate time a Secretary-General of the Conference. It is expected that this post will be established during the twenty-fifth regular session of the General Assembly.

The Secretary-General is pleased to announce that the Prime Minister of Canada has agreed to place at his disposal the services of Mr. Maurice F. Strong, President of the Canadian International Development Agency, for appointment to the post of Secretary-General of the Conference. It is expected that Mr. Strong will take up his new post, with the rank of Under-Secretary-General, on 1 January 1971, when he will assume principal responsibility for environmental affairs within the United Nations Secretariat and act as the chief executive for the 1972 Conference. In the intervening period while discharging his obligations in Canada, Mr. Strong will act in a consultative capacity as the Secretary-General's principal adviser on environmental affairs. Mr. Strong will work in close co-operation with the Department of Economic and Social Affairs.

### **Imperial College Saves 60% With Davis Filters**

The use of Davis industrial air filter elements at the Imperial College of Science and Technology, South Kensington, has resulted in a long-term saving of 60% in comparison with similar installations using throw-away elements, according to the College's Plant Maintenance Engineer, Mr. C. Wright. Thousands of Davis industrial filter elements have been installed at the College during the past four years, not only for general purpose ventilating plants and air conditioning plants but also for air handling units serving specialist plants such as the cobalt unit in the Nuclear Technology Laboratories, radio-active extract plants, animal rooms, and kitchens serving 4,000 meals a day. In all cases, says Mr. Wright, the volume of clean air has been increased by about 15%.



### **Order for Gas Cleaning Plant for Refuse Incinerators**

An order valued at more than £220,000 has been placed with W. C. Holmes & Co. Ltd. for gas cleaning plant for three 12 tons per hour Head Wrightson/Martin refuse incinerators which Head Wrightson are supplying for the city of Coventry.

The two-field electrostatic precipitators are designed to give an outlet dust burden not exceeding 15 kg/hour per incinerator in operation.

### **Testing the Fusibility of Solid Fuel Ash**

Information on the behaviour of the ash of coal or coke is of particular importance in a number of industrial applications, and procedures for determining its fusibility are included in BS 1016: Analysis and testing of coal and coke, Part 15—Fusibility of coal ash and coke ash.

This part has now been revised mainly to incorporate the heating microscope method, of which sufficient experience has now been gained, as an approved method for the determination of deformation, hemisphere and flow temperatures of an ash specimen, in addition to the existing pyramid method.

### **F. E. Beaumont Awarded Contract**

F. E. Beaumont Limited have been awarded a contract to design, manufacture, transport and erect a 120ft high by 7ft 6in diameter steel chimney, with eight insulated inner steel chimney liners, at the Police National Computer Centre, Hendon.

The contract is valued at over £23,000 and is urgently required to be completed by mid-January, 1971.

### **Simon-Carves Chemical Engineering Changes Name to Sim-Chem Limited**

Simon-Carves Chemical Engineering Ltd has formally changed its name to Sim-Chem Limited. The change reflects the fact that the company has logically enough often been abbreviated to Sim-Chem, and has been promoted under that name for several years.

A new £2 million headquarters for Sim-Chem is now being built on a site at Stockport adjacent to the existing offices. The six-storey building is scheduled to be completed in 18 months time. It will enable a further 300 staff to be recruited to handle increased business.

### **The World's Largest Valve?**

The Metro-Flex Group are pleased to announce the completion of what are possibly the three largest valves ever built. The latest Metro-Flex Duplex Isolators, overall dimensions 30ft × 46ft are to be installed at Ballylumford 'B' Power Station to isolate the 26ft 3in × 16ft flues to the chimneys. These valves will enable maintenance to be carried out, in complete safety, on a chimney while the whole station remains ON-LOAD, thereby maintaining availability, efficiency and profitability. They are being supplied to the Electricity Board for Northern Ireland, to the requirements of the consulting engineers, Messrs. Kennedy & Donkin.

### **New Appointment for Parkray**

Radiation Parkray Limited announce the appointment of Mr. A. F. J. Davison as Development Manager, covering Parkray solid fuel appliances. Mr. Davison took up his position on 1 September and is based at the company's Belper production centre.

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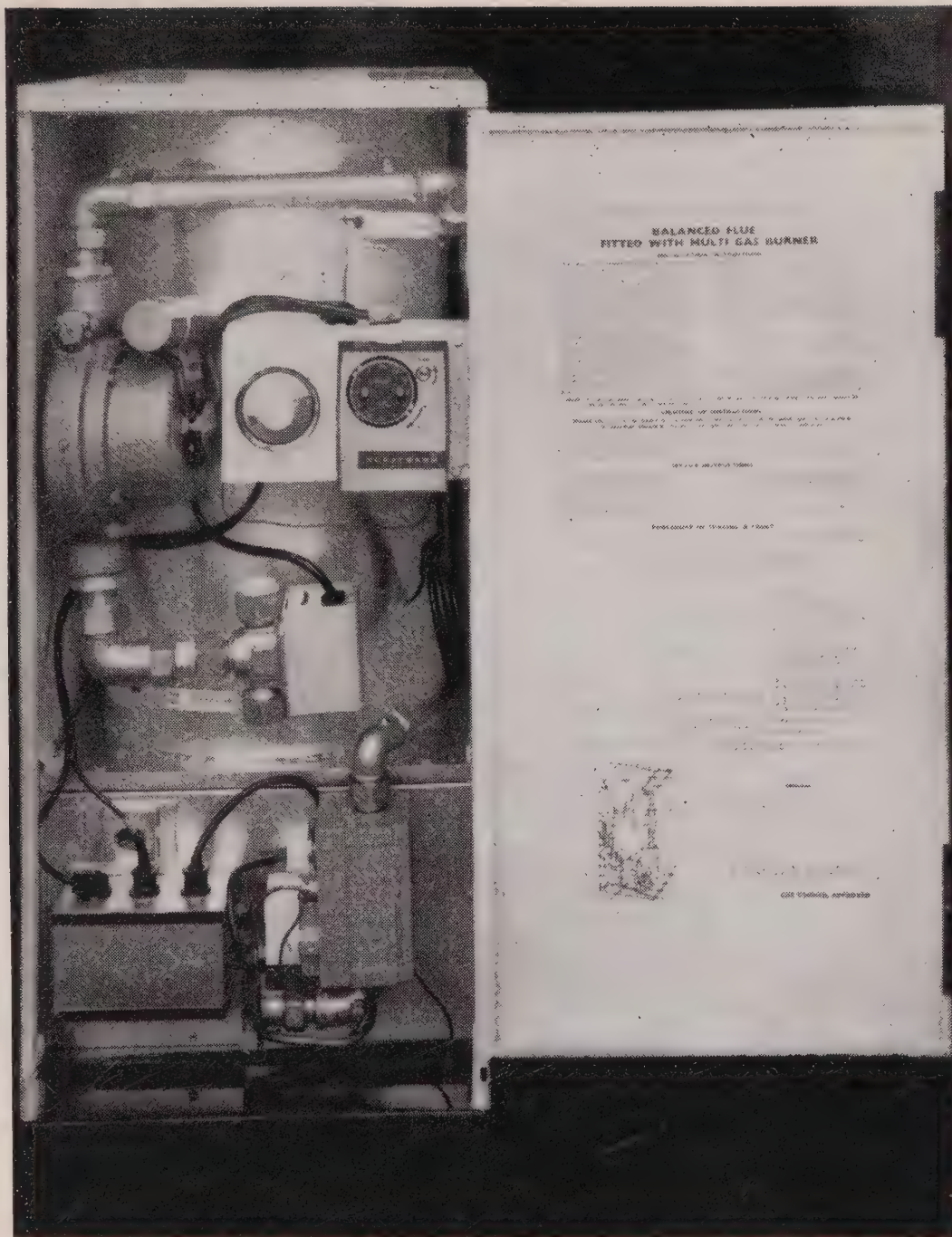
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Stelrad Miniature Low Voltage Controls Boiler

### Stelrad Miniature Low Voltage Controls Boiler

A small compact low voltage gas-fired domestic boiler with a heat output of 35,000 B.t.u. per hour has been introduced by Steel Radiators Limited. Known as the GB35LV, overall dimensions of this boiler are 21in deep by 30in high by 13in wide and included in its design are

brackets for wall mounting, making it ideal for the small house or flat.

The GB35LV has been specifically designed to reduce not only cost but installation time to a minimum and is particularly suitable for local authority modernisation schemes. It is also in the range of boilers offered by the Gas Council for their Guaranteed Warmth Scheme.

## **60 Vehicles Operating from Motorgas**

Motorgas (Smokeless Fuels) Ltd. report that since the opening of their first Motorgas Station they now have more than 60 vehicles operating from it, consuming five tons of liquefied petroleum gas per week. In these vehicles the carbon monoxide content in the exhaust is less than 0.1%, and no visible smoke is emitted.

## **New Director for Dust Suppression Ltd.**

Mr. Stephen Hastings, M.C., M.P., has joined the board of Dust Suppression Limited, a subsidiary of J. W. Ward & Son Ltd., of Hemel Hempstead, specialising in the production and installation of all types of dust control equipment for steel works, power stations, gas works, cokerries, mines, quarries, cement works, etc., under the trade name of Chem-jet.

## **Simon Form Environmental Control Division**

Simon Engineering Ltd. have formed an Environmental Control Division, bringing together a number of Simon companies directly involved in environmental control matters. The division will comprise Lodge-Cottrell Ltd., Birmingham; Simon-Hartley Ltd., Stoke-on-Trent; Aqua Systems Corporation, Chicago, U.S.A.; Simonacco Ltd., Carlisle; and the Sandholme Iron Co. Ltd., Todmorden.

The decision to group these companies together has been taken to enable Simon Engineering to exploit more intensively the fast-growing world markets in the field of environmental and pollution control. The new division will concentrate Simon Engineering's experience in the fields of dust, mist and fume emission control from industrial processes; water pollution control; and chemical and effluent filtration equipment.

Mr. John Hartley, managing director of Simon-Hartley, has been appointed manager of the new division and a director of Lodge-Cottrell and the Sandholme Iron Company.



**In the 1950's he could hardly see the Houses of Parliament...now he keeps an eye on Hampton Court!**



Britain is winning the second Battle of Trafalgar—the fight to get rid of grime in Trafalgar Square and in streets and open spaces throughout the United Kingdom.

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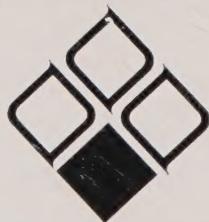
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